British West Indies Central Sugar Cane Breeding Station, Barbados.

IMPERIAL MYCOLOGICAL INSTITUTE
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TENTH ANNUAL REPORT

Ending September 30, 1943.

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I. FOREWORD

The year under review has been one of steady progress while reference to Sections IV and VII of the Report indicates the successes already achieved in Barbados and the contributing colonies.

Nobilisation work which has accounted for the successes so far achieved will be further exploited with existing material and further extended by the importation of additional and new wild cane material (Sections II and V of the Report).

The subject of mosaic disease resistance is to be investigated in Barbados and, it is hoped, in Jamaica with a view to evolving routine methods for evaluating degrees of seedling resistance to mosaic and inheritance of resistance to the disease (Section VIII of the Report).

Of the more recent seedlings, indications are that B.4098 and B.40105 are very promising.

S. J. SAINT
Chairman of Advisory Committee.

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British West Indies Central Sugar Cane Breeding Station, Barbados.

TENTH ANNUAL REPORT FOR THE YEAR ENDING THE 30TH OF SEPTEMBER, 1943

II. POLICIES IN SUGAR CANE BREEDING

The fundamental policy directing the breeding work of the Station aims at extending the degree of variability in all characteristics, in the expectation of obtaining individuals in which desirable commercial characteristics such as weight, juice quality, and disease resistance are combined and expressed to a greater degree than in existing commercial types. To this end, and following on the successes achieved so far, the nobilisation work has been continued, using as parent material nobilisations derived from representatives of so-called wild cane species imported several years back. In so far as this particular phase of nobilisation is concerned, the work is directed to segregating and using as parents individuals belonging to those lines of nobilisation whose derivatives in general have indicated their suitability to one or more of the conditions for which the Station is working. Of the lines derived from nobilisation of the earlier imported material, it is already apparent that those based on "blood" of the Indian *Saccharum spontaneum* and *S. barberi* are the most successful, in that the resulting seedlings display growth-type characteristics which suit West Indian conditions even better than individuals belonging to *Saccharum officinarum* itself or nobilisations based on the varieties of *Saccharum spontaneum* used from Java and the Chinese types of Uba (*Saccharum sinense*).

Nevertheless, derivatives from lines such as those which contain "blood" of Java *Saccharum spontaneum* and Uba (*S. sinense*) have desirable virtues such as fast growth and a high resistance to mosaic disease. Consequently, at present the tendency is to make crosses between selected derivatives of all of these various lines and select with a view to incorporating the virtues of all in the progeny.

In breeding work, in general every effort is made to avoid in-breeding.

Within recent years, further importations have been made for breeding of a selection of the material collected by U.S. Government expeditions in the Far and Near East; this with a view to testing their potentialities in producing types for conditions served by the Station. This aspect will be enlarged upon in another section of this report.

III. SUGAR CANE BREEDING—SEEDLING SELECTION AND TRIALS

(i) SUGAR CANE BREEDING—B.45′ SERIES.

Sugar cane breeding was carried out at Lion Castle from October to December, 1942.

All breeding work consisted in crossing, and the usual lantern method was employed. The season favoured heavy arrowing, and most of the desired crosses were obtained.

(ii) SEEDLING RAISING, POTTING AND PLANTING IN THE FIELD NURSERY—B.45′ SERIES.

The usual sowing and potting methods were used.

Sowing was done from December to January, 1943, and the potting was completed by early March. Potted seedlings were planted in the field nursery during the first two weeks of May.

Table I shows under group heads the numbers of seedlings germinated, potted, and planted in the field nursery, while Appendix I gives these details for all crosses made.

TABLE I.

Numbers of Seedlings in each Group Germinated, Potted and Planted in the Field Nursery—B.45′ Series

GROUP	No. of crosses	No. germinated	No. potted	No. planted in field nursery
Noble Canes—*Saccharum officinarum*	1	45	0	0
S. officinarum x S. barberi .. .. *chunnee*—2nd nobilisation	1	1,528	1,381	0
S. officinarum x S. sinense sinense—2nd nobilisation	1	40	40	0
S. officinarum x S. spontaneum local—2nd nobilisation	1	79	79	60
S. officinarum x S. robustum 2nd nobilisation	2	426	426	353
S. officinarum x S. spontaneum glagah—4th nobilisation	1	4,326	4,030	1,098
S. spontaneum x S. spontaneum glagah x local	1	2,640	620	601
glagah x celebes	1	1,205	530	301
S. spontaneum x S. barberi glagah x chunnee	11	11,722	3,773	2,527
S. spontaneum x S. sinense glagah x sinense	4	511	452	370
S. spontaneum x S. robustum glagah x robustum	2	61	61	50
S. spontaneum x S. sinense x *S. spontaneum* glagah x sinense x celebes	1	13	13	0
S. spontaneum x S. sinense x S. barberi glagah x sinense x chunnee	5	693	690	577
S. spontaneum x S. barberi x S. spontaneum glagah x chunnee x local	2	101	96	50
S. barberi x *S. spontaneum* chunnee x celebes	1	244	244	200
	3	1,957	1,319	1,007
S. barberi x *S. sinense* chunnee x sinense	3	18	0	0
S. barberi x *S. robustum* chunnee x robustum	4	455	451	391
S. officinarum x *Sorghum vulgare* noble x sorghum	3	104	90	65
S. barberi x *Sorghum vulgare* chunnee x imphee	1	2	——	——
S. barberi x *Erianthus arundinaceus* chunnee x *Erianthus arundinaceus* ..	1	——	——	——
S. officinarum x Erianthus arundinaceus	1	——	——	——
C. 281 and its derivatives				
Co. 281 x Co. 290	2	93	92	84
Co. 281 x glagah x chunnee	3	4,405	2,042	1,781
Co. 281 x chunnee	3	1,273	604	498
Co. 281 x noble	1	95	95	90
Co. 281 x sinense	1	69	69	60
Co. 281 x glagah	11	10,340	7,291	6,124
C. 290 and its derivatives				
Co. 290 x glagah	5	927	915	815
Co. 290 x chunnee	3	2,150	1,368	900
Co. 290 x sinense	1	270	270	250
	81	45,792	27,041	18,252

Extensive use as parents has been made of the noble cane—B.3439, the glagah nobilisations—B.3353, B.34102, P.O.J.2878 and B.3337, the chunnee nobilisation—B.3365 and varieties of mixed derivations such as B.34104, Co.281 and Co.290, and Celebes nobilisation—B.35197. These varieties as parents have given seedling progenies of a very high standard.

(iii) PLANTING THE FIRST YEAR SEEDLING TRIAL—B.44′ SERIES

This series was bred in 1941, planted in the Field Nursery in May, 1942, and selections from the Field Nursery planted in the First Year Seedling Trial in October, 1942. This trial will be harvested in 1944. Details for each of the crosses are given in Appendix II. A summary of this Appendix is presented in Table II.

TABLE II.

Numbers of crosses and seedlings in each group planted in the First Year Seedling Trial, October, 1942—B.44 Series.

GROUP	No. of crosses	No. of seedlings planted in trial
S. officinarum noble	3	600
S. officinarum x S. spontaneum		
noble x glagah	6	529
„ x local	2	56
„ x celebes	1	47
S. sinense x S. spontaneum		
sinense (nobilisation) x glagah (nobilisation)	3	199
S. barberi x S. spontaneum		
chunnee (nobilisation) x glagah (nobilisation)	12	2,796
chunnee x local	2	32
S. barberi x *S. sinense*		
chunnee x sinense	1	68
S. barberi x S. officinarum		
chunnee x noble	1	289
S. barberi x S. barberi		
chunnee x chunnee	1	15
S. barberi x *S. sinense x S. spontaneum*		
chunnee x sinense x glagah	2	102
S. robustum		
1st nobilisation	1	1,051
2nd nobilisation	1	139
Co. 281 and its derivatives		
glagah x Co. 281	10	2,170
Co. 281 x chunnee	3	205
„ „ x noble	1	36
„ „ x sinense	1	40
Co. 290 and its derivatives		
glagah x Co. 290	1	70
Co. 290 x noble	1	578
Co. 290 x sinense x glagah	1	802
chunnee x Co. 290	1	14
	55	9,838

This trial was planted in five randomised blocks, the seedlings from each cross being, as far as possible, evenly distributed between each of the blocks, except the total population for a cross numbered forty seedlings or less when all seedlings were planted together in Block I.

(iv) RESULTS OF REAPING THE FIRST YEAR SEEDLING TRIALS—B.43′ SERIES.

These were bred in 1940, planted in the Field Nursery in April, 1941 and from this into the First Year Seedling Trial in October, 1941.

In previous years it has been the practice to harvest half of the seedlings early in the season, and the remainder late in the season. This year, however, it was decided to harvest all of the seedlings about mid-season, as difficulty has been experienced in getting a satisfactory germination from seedlings selected late in the season.

The seedlings were cut, bundled and laid out for inspection and selections were made as in recent years. Four hundred and fourteen selections were made

Table III gives details of field and final selections.

TABLE III.

First Year Seedlings—B.43′ Series
Field and Final Selections.

Cross.	No. Seedlings Reaped	No. Selected in Field.	% Field Selection	No. Finally Selected	% Final Selection.
B.3371 x B.603	37	2	5	2	5
Co.213 x P.O.J.2878	15	0	0	0	0
B.3365 x P.O.J.2878	253	7	3	6	2
B.37161 x P.O.J.2878	35	7	20	7	20
B.35206 x P.O.J.2878	201	16	8	8	4
Co.213 x B.3337	10	0	0	0	0
B.3365 x B.39281	15	2	13	1	7
B.3353 x P.O.J.234	73	3	4	1	1
B.3354 x P.O.J.234	72	5	7	1	1
B.39253 x P.O.J.234	100	1	1	0	0
B.34102 x P.O.J.234	150	2	1	0	0
B.3439 x B.37175	664	63	10	44	6
B.35247 x P.O.J.2878	473	42	9	22	5
B.37227 x P.O.J.2878	250	19	8	6	2
B.35197 x P.O.J.2878	201	15	7	7	3
B.37227 x B.3337	101	18	18	11	11
B.35247 x B.3337	485	81	17	33	7
B.34102 x B.3337	204	21	10	11	5
B.3353 x B.3337	124	10	8	4	3
B.3354 x B.3337	151	20	13	6	4
B.34102 x B.39262	42	1	2	1	2
B.34102 x B.39267	40	4	10	4	10
B.3013 x B.38277	30	2	7	0	0
B.3439 x B.38279	30	2	7	1	3
B.3439 x B.38283	32	4	13	1	3
B.37226 x P.O.J.2878	40	2	5	0	0
B.34102 x B.35275	81	1	1	1	1
B.3354 x B.37224	33	1	3	1	3
B.34102 x C.290	84	9	11	4	5
M.D.47 x Co.290	309	30	10	8	3
B.3353 x Co.290	77	6	8	3	4
B.3354 x Co.290	151	31	21	16	11
B.35218 x P.O.J.2878	202	15	7	12	6
B.3274 x B.34107	272	10	4	1	0
B.34102 x B34104	290	33	11	20	7
B.34117 x P.O.J.2878	150	6	4	4	3
Co.281 x B.2935	98	0	0	0	0
B.3439 x Co.290	69	12	17	6	9
B.35218 x B.3899	28	3	11	0	0
B.38276 x Co.281	200	5	3	2	1
B.35247 x B.35269	253	23	9	8	3
B.37162 x P.O.J.234	47	1	2	1	2
B.37227 x P.O.J.234	42	0	0	0	0
B.3365 x B.39274	344	29	8	9	3
B.35197 x Co.281	588	53	9	28	5
B.35197 x B.34104	602	64	11	43	7
B.35197 x B.38280	140	19	14	4	2
B.35197 x B.38281	151	23	15	8	5
B.35197 x B.38282	150	17	11	4	3
B.35197 x B.38285	151	14	9	7	5
B.35206 x B.2935	113	6	5	3	3
B.3365 x B.34104	1240	88	7	41	3
B.3365 x B.39245	32	3	9	0	0
B.3365 x B.37261	114	6	5	2	2
B.37263 x P.O.J.234	9	0	0	0	0
B.3439 x B.39250	27	4	15	1	4
B.34117 x P.O.J.234	150	3	2	0	0
	10025	864	8.6	414	4.1

As a result of this trial, it has been decided to discard P.O.J.234 as a parent, and none of the crosses involving this variety have been planted in the Field Nursery this year. It was also decided not to repeat any of the following crosses, as the percentage of seedlings selected from their progenies is not sufficiently large.

Co.213 x P.O.J.2878	B.34102 x B.39262	B.3274 x B.34107
B.3365 x „	B.3013 x B.38277	Co.281 x B.2935
Co.213 x B.3337	B.3439 x B.38283	B.35218 x B.3899
B.3365 x B.39281	B.37226 x P.O.J.2878	B.38276 x Co.281
B.37227 x P.O.J.2878	B.34102 x B.35275	B.35197 x B.38280
B.35197 x B.39245	B.3365 x B.39245	

(v) PROGRESS WITH SEEDLINGS OF THE B.42′ SERIES

The 338 selections made in 1942 were planted in ten cane hole plots, and in October, 1942, a further selection was made, the total being then reduced to 144. These seedlings were divided in half, one half being planted in the Second Year Seedling Trials at the low rainfall station—Codrington—and the high rainfall station—Todds—and the other half at the low rainfall station—Dodds— and the high rainfall station—Pool. The standard varieties used are as follows:—

Codrington and Dodds	B.37161.
Todds and Pool	B.37161, B.34104 and B.4098.

(vi) PROGRESS WITH SEEDLINGS OF THE B.41′ SERIES

These seedlings were planted in the Second Year Seedling Trial in October, 1941, at the low rainfall stations, Codrington and Dodds, and the high rainfall stations, Cliff and Todds, together with certain of the B.40′ series of noble seedlings which had not yet been tested in the Second Year Trial. In all, 23 seedlings were selected at reaping during the 1943 crop. These will be sent to the Quarantine Station in Trinidad for distribution to contributing Colonies, and included in the Select Seedling Trials in Barbados to be harvested in 1945.

The performances of the selected seedlings and the standard varieties used in the four experiments are presented in Tables IV and V.

TABLE IV.

Central Sugar Cane Breeding Station Second Year Seedling Trial—B.41′ Series.
Dodds and Todds. Performances of Standards and Selected Seedlings.
(Figures given are the Means of Six Plots.)

Dodds Harvested 17th—19th March, 1943; Todds Harvested 12th—14th April, 1943.

Seedling	Parentage	Mean No. Canes per Plot (Rotten)		% Arrowing		Z.H.R. Brix.		Mean Yield Tons/Acre	
		Dodds	Todds	Dodds	Todds	Dodds	Todds	Dodds	Todds
B.3439 ..	Standard	131(6)	..	3	..	23.5	..	47.39	..
B.35187 ..	„	..	80(10)	..	..	..	20.1	..	40.08
B.35245 ..	„	..	74(18)	..	3	..	22.4	..	39.90
B.37161 ..	„	129(10)	..	2	..	21.6	..	48.76	..
B.4110 ..	B.3365 x P.O.J. 2878	108(5)	127(7)	1	31	21.9	20.9	50.75	51.69
B.4111 ..	„ x „	107(8)	120(12)	27	56	22.4	23.1	39.82	44.46
B.4146 ..	B.3354 x B.H.10(12)	105(8)	115(16)	13	17	23.3	22.8	41.37	44.20
B.4148 ..	„ x „	114(4)	134(16)	..	5	21.3	22.4	33.37	51.60
B.4196 ..	B.3439 x B.3307	153(5)	153(10)	1	8	22.0	22.1	43.34	46.96
B.41104 ..	„ x „	84(13)	101(11)	3	14	24.3	24.1	41.71	43.95
B.41228 ..	B.35207 x P.O.J. 2878	157(9)	162(19)	14	50	22.3	22.1	47.64	48.07
B.41261 ..	B.3439 x B.37256	225(6)	221(7)	19	66	21.7	21.3	45.15	45.41

The following difference between mean yields may be considered statistically significant:—

Dodds .... ± 6.35
Todds .... ± 7.74 } Tons cane per acre.

TABLE V.

Codrington and Cliff. Performances of Standards and Selected Seedlings.

Codrington harvested 25th—27th January, 1943; Cliff harvested 25th—27th February, 1943.

Seedling.	Parentage.	Mean No. Canes per plot (rotten)		% Arrowing		Z.H.R. Brix		Mean Yield Tons/acre	
		Codrington	Cliff	Codrington	Cliff	Codrington	Cliff	Codrington	Cliff
B.3439 ..	Standard	109(1)	—	0	—	21.6	—	35.23	—
B.35187 ..	„	—	102(12)	—	0	—	18.3	—	50.57
B.35245 ..	„	—	105(5)	—	3	—	20.6	—	44.12
B.37161 ..	„	104(5)	—	0	—	20.0	—	42.62	—
B.4022 ..	B.3439 x B.H.10(12)	117(3)	161(6)	3	40	19.6	20.2	31.97	52.29
B.4102 ..	B.3215 x P.O.J.2878	120(5)	140(8)	—	26	21.3	19.5	36.58	43.77
B'4126 ..	B.3365 x B.2935 ..	86(3)	122(6)	—	20	18.8	17.9	35.52	45.41
B.4137 ..	Co.213 x P.O.J.2878	164(3)	204(5)	37	61	21.8	20.3	34.75	52.29
B.4145 ..	B.3354 x B.H.10(12)	112(2)	139(5)	12	40	19.5	19.5	40.61	60.45
B.4158 ..	B.3439 x B.37161 ..	108(3)	145(12)	7	2	19.0	17.9	39.65	44.38
B.41103 ..	B.3439 x B.3307 ..	102(1)	152(5)	4	30	21.0	21.7	31.30	47.04
B.41203 ..	B.3439 x B(30)L.7	99(4)	111(12)	1	14	20.3	20.0	35.04	44.63
B.41204 ..	B.3439 x B(30)L.7	133(2)	172(4)	3	27	20.5	21.8	33.79	44.89
B.41211 ..	B.3439 x B.37252 ..	131(2)	177(5)	0	1	19.3	20.3	40.80	64.16
B.41226 ..	B.35207 x P.O.J.2878	142(4)	170(3)	3	13	20.3	21.2	32.26	49.11
B.41227 ..	B.35207 x P.O.J.2878	164(5)	193(5)	2	7	20.5	19.4	43.30	63.73
B.41229 ..	B.35207 x P.O.J.2878	120(4)	139(2)	46	62	21.1	21.2	35.90	42.50
B.41238 ..	B.35207 x P.O.J.2878	161(4)	179(7)	—	19	19.6	18.5	37.54	47.55
B.41255 ..	B.3439 x B.37256 ..	171(0)	177(5)	9	94	17.4	17.1	47.14	55.38

The following differences between mean yields may be considered statistically significant:—

Codrington .... ± 5.92 } Tons cane per acre.
Cliff .... ± 6.13 }

(vii) PROGRESS WITH SEEDLINGS OF THE B.40′ SERIES

These were reaped as plant canes in the Second Year Seedling Trials in 1942. The selections were multiplied at Codrington in 1942 and in October they were planted in the Select Seedling Trials to be harvested in 1944. The selections were harvested as first ratoons from the Central Sugar Cane Breeding Station Second Year Seedling Trial at Cliff in 1943, and their performances together with the performances of the standard variety B.H.10(12) are presented in Table VI below.

TABLE VI.

Central Sugar Cane Breeding Station Second Year Seedling Trial—First Ratoons. Harvested at Cliff 24th March, 1943.
(Figures given are the means of four plots)

(a) THICK CANE TRIAL.

Seedling	Parentage	Mean No. Canes Per Plot (rotten)	Arrowing %	Z.H.R. Brix	Mean Yield Tons/Acre
B.H.10(12 ..	Standard	114(5)	—	22.8	33.80
B.4029 ..	B.3172 x B.2935	77(4)	—	22.1	24.60
B.4091 ..	B.3439 x Co. 290	176(13)	41	22.3	41.54
B.4096 ..	„ x „	122(3)	6	22.1	41.37
B.4098 ..	„ x „	182(2)	12	23.5	52.03
B.40108 ..	„ x „	136(8)	18	22.2	34.66
B.40115 ..	„ x „	157(3)	8	23.4	39.22
B.40117 ..	„ x „	119(7)	37	22.5	37.67
B.40126 ..	B.3013 x B.34161	142(3)	—	23.6	34.31
B.40130 ..	B.3013 x B.35176	125(2)	14	22.6	40.42
B.40133 ..	B.3013 x B.3337	158(4)	—	22.3	45.50
B.40152 ..	B.34137 x B.2935	135(7)	—	21.3	33.71
B.40164 ..	B.3274 x B.H.10(12)	120(1)	1	22.7	40.76
B.40174 ..	B.3371 x B.2935	154(2)	—	22.7	43.00

A difference of ±9.21 tons may be considered significant.

(b) THIN CANE TRIAL.

Seedling	Parentage	Mean No. of Canes per Plot (rotten)	Arrowing %	Z.H.R. Brix	Mean Yield Tons/Acre
B.H.10(12) ..	Standard	77(14)	—	22.8	25.84
B.34104 ..	„	198(7)	19	23.9	48.28
B.4097 ..	B.3439 x Co. 290	161(2)	93	23.9	45.30
B.4099 ..	„ x „	148(4)	4	22.8	30.51
B.40100 ..	„ x „	175(5)	41	21.9	37.91
B.40102 ..	„ x „	165(2)	50	21.8	41.39
B.40105 ..	„ x „	174(3)	9	23.2	42.92
B.40112 ..	„ x „	198(4)	92	23.6	44.11
B.40114 ..	„ x „	206(4)	54	23.3	37.14
B.40116 ..	„ x „	157(5)	11	22.6	42.50

A difference of ± 9.76 tons/acre between mean yields may be considered significant.

(viii) SELECT SEEDLING AND CO-OPERATIVE VARIETY TRIALS

A. THE SEEDLINGS TESTED

(1) *Select Seedling Trials*

Plant Canes	B.34110, B.37193, B.38209, B.39157, B.39171, B.39177, B.39184, B.39200, B.39207, B.39211, B.39220, B.39222, B.39237, B.39240, B.4019, B.4092, B.4094, B.40118.
1st Ratoons	B.3439, B.34104, B.35187, B.37161, B.38155, B.38209, B.38212, B.4092, B.4094, B.40118.
2nd Ratoons	B.37161.

(2) *Co-operative Variety Trials*

2nd Ratoons	B.35187, B.35245.

B. AN ECOLOGICAL CLASSIFICATION OF THE TRIALS

The classification is similar to that used in recent years, and is as follows:—

(a) Black coral limestone soils where the average seasonal rainfall is low. On account of low rainfall ratooning is difficult and cane tonnages usually low. Stations in this category were:—

Select Seedling Trials

Plant Canes	Three Houses
1st Ratoons	Sandford

(b) Black coral limestone soils of low-intermediate rainfall. On account of better rainfall than Category (a) a certain amount of ratooning is practised. The extent of ratooning would increase were stronger ratooning varieties available. The stations in this category were:—

Select Seedling Trials

Plant Canes	Bourbon, Hannays, Small Ridge, Springhall, Oughterson, Lower Estate, Brighton, Lowthers.
1st Ratoons	Westmoreland.
2nd Ratoons	Welchtown.

(c) Valley deep black coral limestone soil area, low-intermediate rainfall. This area may suffer periodic water-logging. Soils, especially sub-soils, tend to a heavy texture and root diseases are commonest here. Varieties resistant to the root disease complex are therefore necessary. A considerable percentage of this area is ratooned. Stations in this category were:—

Select Seedling Trials

Plant Canes	Bulkeley.
1st Ratoons	Bulkeley.

(d) Red coral limestone area, intermediate to high rainfall. One to four ratoon crops are grown here. The stations in this category were:—

(1) *Select Seedling Trials*

Plant Canes	....	Redland, Kendal, Walkers, Castle.
1st Ratoons	....	Guinea, Andrews and Society (Maturity Trial).
2nd Ratoons	....	Claybury, Easy Hall and Pool (Maturity Trial).
4th Ratoons	....	Mount Wilton.

(2) *Variety Trials*

2nd Ratoons	....	Ashbury, Horse Hill, Farmers, Mount Wilton, Clifton Hall.

(e) Sandy coral limestone soils where the average annual rainfall is low to intermediate. These soils, on account of their comparatively light texture are liable to dry out rapidly.

Select Seedling Trials

1st Ratoons	....	Six Mens.

C. RAINFALL

Seasons.

Month	1920-21 to 1939-40	1940-41	1941-42	1942-43
January ..	3.33	2.32	1.46	2.17
February ..	1.96	0.44	0.48	1.72
March	1.58	5.46	1.50	1.07
April	1.61	0.56	1.55	4.10
May	1.93	1.11	1.91	1.06
June	4.41	2.54	3.02	4.23
July	6.31	5.50	4.72	7.41
August ..	6.24	6.50	5.11	4.63
September ..	7.22	6.17	10.08	5.55
October ..	7.55	6.07	8.15	6.91
November ..	9.46	7.18	7.61	9.81
December ..	4.09	1.89	3.40	4.64
January ..	3.29	1.46	2.17	2.83
February ..	1.86	0.48	1.72	1.08
March	1.73	1.50	1.07	2.68
Totals ..	62.57	49.18	53.95	59.89

As can be seen from the above Table, the rainfall during the 1942-43 season was better than that of the previous season, although not quite up to the aver-

age of the 1920-1940 period. In addition the distribution was better, and this accounts in part for the large sugar crop harvested.

An interesting feature of these figures is the exceptionally high rainfall for April, 1942. This was no doubt effective in securing a good spring in ratoon fields, and probably played a large part in the heavy yields obtained.

The weather during the reaping period was ideal for reaping, and in addition to high tonnages, good juice brix values were obtained.

D. RESULTS OF THE TRIALS

In the Select Seedling Plant Cane Trials the following data is obtained:— (1) cane tonnage, (2) number of rotten canes per plot, (3) complete cane chemical analysis from plot sample bundles and so (4), a calculation of the sucrose yield per acre.

N.B. Owing to a shortage of trained Analytical Staff during the reaping season, it was decided at first to take samples for chemical analysis from two only of the four replicates of each seedling in each experiment. This proved unsatisfactory, and it was later decided to take samples from all replicates of the more promising varieties only. To ensure a random sample every twentieth cane was selected, and if this was not a whole cane, the next whole cane to be thrown off the scale was taken. A sample bundle of 120 lb. weight was then taken at random from the sample obtained by this method.

In the Select Seedling Ratoon Trials, cane tonnages, number of rotten canes and hand refractometer brix values are obtained.

In the variety trials, cane tonnages, hand refractometer brix figures are obtained.

The results from the several categories are considered here.

CATEGORY A

Results are given in Tables VII and VIII.

TABLE VII.

Select Seedling Trials — Plant Canes

Estate — Three Houses. Harvested 19th & 20th February, 1943

Variety	Cane Tons/Acre		% Sucrose in Cane		Quotient of Purity		Sugar Tons/Acre		No. Rotten Canes/Plot	
	Group I	Group II	Group I	Group II	Group I	Group II	Group I	Group II	Group I	Group II
B.37161 ..	50.78	39.63	13.9	15.6	87.9	89.2	7.09	6.17	23	14
B.37193 ..	47.37	—	13.4	—	86.5	—	6.37	—	27	—
B.38233 ..	46.35	—	—	—	—	—	—	—	80	—
B.39171 ..	30.44	—	—	—	—	—	—	—	68	—
B.39177 ..	—	32.27	—	15.7	—	87.0	—	5.09	—	13
B.39200 ..	23.35	—	—	—	—	—	—	—	173	—
B.39207 ..	34.60	—	—	—	—	—	—	—	53	—
B.39211 ..	42.58	—	13.9	—	85.0	—	5.93	—	83	—
B.39222 ..	—	26.23	—	—	—	—	—	—	—	27
B.39237 ..	—	29.22	—	—	—	—	—	—	—	55
B.39240 ..	39.54	—	15.7	—	88.7	—	6.18	—	21	—
B.4092 ..	—	36.44	—	15.5	—	88.6	—	5.64	—	25
B.40118 ..	—	40.54	—	—	—	—	—	—	—	13

The following differences between mean yields may be considered significant :—

Group I	*Group II*
Sugar : Insignificant	± 0.75 tons/acre
Cane ± 8.04 tons/acre	± 3.35 tons/acre

TABLE VIII

Select Seedling Trials—1st Ratoons

Group II — Sandford. Harvested 19th March, 1943

Variety	Tons Cane/Acre	Z.H.R. Brix	No. Rotten Canes/Plot
B.2935 ..	27.41	21.4	14
B.3439 ..	35.69	23.7	5
B.34104 ..	34.10	24.7	5
B.38212 ..	21.75	23.9	12
B.4094 ..	32.59	20.1	7

A difference of ±7.31 tons of cane per acre between mean yields may be considered significant.

In the plant-cane Select Seedling Trial, none of the seedlings gave promise of being better than the standard.

In the Select Seedling Trials 1st Ratoons, the varieties B.34104 and B.3439 were better than the standard B.2935 and the other varieties tested, both as regards cane tonnage and juice quality.

CATEGORY B.

The results are presented in Tables IX, X and XI.

TABLE IX.

SELECT SEEDLING TRIALS—PLANT CANES.

Estates and Dates of Harvesting:—Bourbon 5th & 6th February, Small Ridge 2nd & 3rd February, Hannays 2nd & 3rd March, Spring Hall 23rd & 24th February, Brighton 12th & 13th February, Oughterson 16th & 17th February, Lower Estate 9th & 10th March, Lowthers 23rd & 24th March.

GROUP I

Variety	TONS CANE PER ACRE								TONS SUGAR PER ACRE								% SUCROSE IN CANE								QUOTIENT OF PURITY								NUMBER OF ROTTEN CANES/PLOT								Variety
	Lowthers	Small Ridge	Bourbon	Brighton	Oughterson	Spring Hall	Hannays	Lower Estate	Lowthers	Small Ridge	Bourbon	Brighton	Oughterson	Spring Hall	Hannays	Lower Estate	Lowthers	Small Ridge	Bourbon	Brighton	Oughterson	Spring Hall	Hannays	Lower Estate	Lowthers	Small Ridge	Bourbon	Brighton	Oughterson	Spring Hall	Hannays	Lower Estate	Lowthers	Small Ridge	Bourbon	Brighton	Oughterson	Spring Hall	Hannays	Lower Estate	
B.34104 ..	—	35.38	32.13	38.41	—	25.96	41.21	41.95	—	5.35	4.89	5.73	—	4.42	6.69	6.89	—	15.1	15.4	15.0	—	17.1	16.2	16.4	—	91 1	89.2	90.3	—	90.3	89.8	85.7	—	7	13	11	—	12	30	10	B.34104
B.35187 ..	—	—	24.44	—	—	—	—	—	—	—	3.65	—	—	—	—	—	—	—	14.9	—	—	—	—	—	—	—	89.0	—	—	—	—	—	—	—	11	—	—	—	—	—	B.35187
B.35245 ..	—	31.32	—	39.28	—	—	31.92	—	—	4.90	—	5.71	—	—	—	—	—	15.6	—	14.6	—	—	—	—	—	92.1	—	92.1	—	—	—	—	—	4	—	9	—	—	30	—	B.35245
B.37161 ..	39.15	41.50	39.23	46.86	41.00	31.29	48.03	43.91	5.34	6.01	5.30	6.61	5.78	5.01	7.14	6.99	14.9	14.3	14.8	14.2	14.1	16.0	14.9	15.4	87.8	91.5	90.0	89.8	89.3	89.5	89.3	85.8	49	7	12	11	32	14	29	6	E.37161
B.37193 ..	29.69	—	—	42.36	—	—	—	—	4.47	—	—	5.69	—	—	—	—	15.1	—	—	13.4	—	—	—	—	87.2	—	—	87.7	—	—	—	—	66	—	—	6	—	—	—	—	B.37193
B.38209 ..	—	38.34	—	—	—	25.93	—	43.02	—	5.45	—	—	—	—	—	—	—	14.0	—	—	—	—	—	—	—	91.1	—	—	—	—	—	—	—	9	—	—	—	16	—	15	B.38209
B.38233 ..	31.27	—	—	—	33.44	25.24	—	—	—	—	—	—	4.19	—	—	—	—	—	—	—	13.6	—	—	—	—	—	—	—	—	—	—	—	113	—	—	—	106	28	—	—	B.38233
B.39171 ..	—	—	27.41	39.00	—	—	—	31.64	—	—	3.75	5.37	—	—	—	—	—	—	14.0	13.7	—	—	—	—	—	—	87.7	87.1	—	—	—	—	—	—	23	31	—	—	—	43	B.39171
B.39184 ..	18.89	31.15	—	—	26.81	20.10	33.66	—	—	4.31	—	—	3.85	—	—	—	—	13.9	—	—	14.4	—	—	—	—	86.0	—	—	—	—	—	—	162	14	—	—	45	64	53	—	B.39184
B.39200 ..	28.45	32.55	30.20	30.43	26.30	24.95	25.74	39.32	—	5.04	4.88	4.76	4.02	—	—	—	—	15.4	16.2	15.7	15.4	—	—	—	—	90.7	90.0	89.6	89.3	—	—	—	68	10	20	100	68	38	166	16	B.39200
B.39207 ..	—	—	29.40	—	—	24.55	—	37.41	—	—	3.81	—	—	—	—	—	—	—	13.1	—	—	—	—	—	—	—	85-0	—	—	—	—	—	—	—	16	—	—	9	—	24	B.39207
B.39211 ..	25.31	35.61	—	—	33.11	—	37.83	39.80	3.62	4.99	—	—	4.57	—	5.52	5.82	14.4	14.0	—	—	13.8	—	14.6	14.7	82.7	87.0	—	—	85.5	—	86.0	84.1	98	11	—	—	64	—	80	24	B.39211
B.39220 ..	—	—	22.28	34.96	—	20.43	—	32.29	—	—	3.52	5.44	—	—	—	—	—	—	15.8	15.6	—	—	—	—	—	—	87.3	88.6	—	—	—	—	—	—	33	28	—	28	—	33	B.39220
B.39240 ..	—	34.81	25.58	40.47	36.28	—	—	—	—	5.41	3.90	5.86	5.61	—	—	—	—	15.8	15.2	14.5	16.5	—	—	—	—	91.1	88.6	89.9	89.7	—	—	—	—	4	26	7	26	—	—	—	B.39240

The following differences between mean yields may be considered to be significant:—

		Lowthers	Small Ridge	Bourbon	Brighton	Oughterson	Spring Hall	Hannays	Lower Estate
GROUP I —	Sugar —	± 0.56	± 0.56	± 0.37	± 0.62	± 0.40	± 0.43	± 0.75	± 0.47
	Cane —	± 2.88	± 3.48	± 3.17	± 4.11	± 4.14	± 5.15	± 3.85	± 2.80

TABLE IX—(*Continued.*)

SELECT SEEDLING TRIALS—PLANT CANES

GROUP II

Variety	TONS CANE PER ACRE								TONS SUGAR PER ACRE								% SUCROSE IN CANE								QUOTIENT OF PURITY								NUMBER OF ROTTEN CANES/PLOT								Variety
	Lowthers	Small Ridge	Bourbon	Brighton	Oughterson	Spring Hall	Hannays	Lower Estate	Lowthers	Small Ridge	Bourbon	Brighton	Oughterson	Spring Hall	Hannays	Lower Estate	Lowthers	Small Ridge	Bourbon	Brighton	Oughterson	Spring Hall	Hannays	Lower Estate	Lowthers	Small Ridge	Bourbon	Brighton	Oughterson	Spring Hall	Hannays	Lower Estate	Lowthers	Small Ridge	Bourbon	Brighton	Oughterson	Spring Hall	Hannays	Lower Estate	
B.35187 ..	—	34.82	—	47.07	—	—	44.19	—	—	4.82	—	6.69	—	—	6.69	—	—	13.7	—	14.2	—	—	15.2	—	—	90.9	—	89.5	—	—	89.7	—	—	5	—	5	—	—	14	—	B.35187
B.37161 ..	39.40	40.42	34.25	48.59	43.39	31.03	48.86	44.79	6.00	5.61	4.99	7.06	6.12	4.92	7.26	7.06	15.2	13.9	14.5	14.5	14.1	15.9	14.9	15.7	87.5	89.9	90.2	90.7	88.6	90.0	88.8	90.2	39	4	11	7	22	11	24	8	B.37161
B.39157 ..	30.36	—	26.88	38.50	33.76	26.41	35.84	—	—	—	3.44	4.90	—	—	—	—	—	—	12.5	12.8	—	—	—	—	—	—	81.7	84.9	—	—	—	—	26	—	6	12	12	7	10	—	B.39157
B.39171 ..	—	29.66	—	—	—	—	—	—	—	3.98	—	—	—	—	—	—	—	13.6	—	—	—	—	—	—	—	86.7	—	—	—	—	—	—	—	10	—	—	24	8	17	8	B.39171
B.39177 ..	34.63	39.99	33.58	40.37	34.93	30.04	44.95	41.44	5.98	5.61	5.03	6.24	5.26	5.17	7.25	6.78	17.3	13.9	14.7	15.5	15.1	17.2	16.1	16.4	88.9	88.6	81.1	89.2	87.4	89.4	89.1	89.4	34	2	4	7	64	—	—	—	B.39177
B.39207 ..	—	—	—	—	26.71	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	53	—	B.39207
B.39222 ..	25.62	29.79	24.77	39.93	27.18	—	35.10	—	—	4.48	3.90	5.89	—	—	—	—	—	15.0	15.5	14.8	—	—	—	—	—	88.5	86.4	87.8	—	—	—	—	51	7	16	13	33	—	—	—	B.39222
B.39237 ..	—	30.79	25.88	—	—	24.52	—	31.00	—	4.85	4.22	—	—	—	—	—	—	15.7	16.3	—	—	—	—	—	—	91.7	90.0	—	—	—	—	—	51	12	50	—	—	24	—	9	B.39237
B.39240 ..	31.64	—	—	—	—	—	43.35	—	5.28	—	—	—	—	—	7.21	—	16.6	—	—	—	—	—	16.6	—	89.0	—	—	—	—	—	90.2	—	93	—	—	—	—	16	—	6	B.39240
B.4019 ..	—	—	—	43.39	—	26.51	—	37.98	—	—	—	6.41	—	4.08	—	—	—	—	—	14.8	—	15.4	—	—	84.5	—	—	87.7	—	86.0	—	—	—	—	—	—	15	—	6	B.4019
B.4092 ..	30.99	—	—	—	35.17	—	—	—	4.65	—	—	—	4.85	—	—	—	15.0	—	—	—	13.8	—	—	15.5	—	—	87.2	—	86.3	—	65	—	134	—	—	—	—	67	—	22	B.4092
B.4094 ..	—	—	32.12	—	—	27.69	—	38.05	—	—	4.84	—	—	4.34	—	5.89	—	—	—	—	—	15.7	—	13.0	—	—	—	—	—	—	—	88.4	—	—	24	—	—	—	—	4	B.4094
B.40118 ..	—	—	—	—	—	—	—	41.87	—	—	—	—	—	—	—	5.45	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	82.2	—	—	—	—	—	—	—	—	B.40118

The following differences between mean yields may be considered significant:—

		Lowthers	Small Ridge	Bourbon	Brighton	Oughterson	Spring Hall	Hannays	Lower Estate
GROUP II ..	Sugar ..	± 0.45	± 0.35	± 0.51	± 0.40	± 0.43	± 0.34	Insig :	± 0.86
	Cane ..	± 4.55	± 2.83	± 3.23	± 2.74	± 3.46	± 2.25	± 3.29	± 5.60

In the Select Seedling Trials, First Ratoons, the variety B.4092 gave the best cane tonnage, although the juice brix was not so good as those of the varieties B.3439, B.34104 and B.38155.

In the Select Seedling Trials, Second Ratoons, the variety B.37161 was outstanding.

CATEGORY C

The results are presented in Tables XII and XIII.

TABLE XII

Select Seedling Trials — Plant Canes

Estate — Bulkeley. Harvested 9th and 10th February, 1943

Variety	Tons/Acre Cane		% Sucrose in Cane		Quotient of Purity		Sugar Tons/ Acre		No. Rotten Canes/Plot	
	Group I	Group II	Group I	Group II	Group I	Group II	Group I	Group II	Group I	Group II
B.35187 ..	—	43.55	—	13.3	—	87.6	—	5.77	—	6
B.35245 ..	38.80	—	15.4	—	90.8	—	5.96	—	6	—
B.37161 ..	51.32	53.23	13.6	13.4	87.3	87.6	6.97	7.10	7	11
B.37193 ..	49.83	—	12.8	—	84.4	—	6.36	—	8	—
B.38209 ..	—	38.11	—	13.6	—	87.0	—	5.14	—	67
B.39157 ..	—	39.33	—	12.3	—	82.1	—	4.82	—	6
B.39171 ..	35.36	—	13.8	—	85.7	—	4.88	—	17	—
B.39177 ..	—	48.76	—	14.7	—	87.9	—	7.14	—	6
B.39200 ..	37.31	—	15.6	—	88.8	—	5.88	—	11	—
B.39207 ..	—	38.85	—	13.0	—	83.9	—	5.03	—	15
B.39211 ..	43.37	—	13.7	—	84.8	—	5.91	—	16	—
B.39220 ..	33.19	—	15.0	—	86.2	—	4.99	—	16	—
B.39237 ..	—	41.74	—	16.1	—	90.7	—	6.70	—	7
B.39240 ..	45.82	—	15.3	—	88.7	—	6.99	—	8	—
B.40118 ..	—	50.25	—	11.5	—	80 4	—	5.81	—	4

The following differences between mean yields may be considered significant :—

	Group I	*Group II*
Sugar	±0.54 tons/acre	±0.64 tons/acre
Cane	±3.42 tons/acre	±4.68 tons/acre

TABLE XIII

Select Seedling Trials — 1st Ratoons
Group II — Bulkeley. Harvested 10th February, 1943

Variety	Tons Cane/Acre	Z.H.R. Brix	No. Rotten Canes/Plot
B.726 ..	33.23	20.8	1
B.34104 ..	54.36	21.0	5
B.38212 ..	37.85	20.2	1

N.B. : Two plots of B.37161, 1st Ratoons of 40 cane holes each growing adjacent to, and strictly comparable with the plots in the experiment, were harvested and gave 45.26 tons/acre and 48.01 tons/acre with Z.H.R. Brixes of 18.1 and 19.8 respectively.

A difference of ±5.44 tons cane/acre between mean yields may be considered significant.

In the Select Seedling Trials, Plant Canes, B.37161, B.37193, B.39177, B.39237 and B.39240 were easily the best. B.37161 gave the highest cane tonnage in both groups, but was beaten on yield of sugar per acre by B.39240 in Group I and B.39177 in Group II. The differences were however insignificant in both cases. The seedling B.37193, which is a thin cane gave an impressive performance, and remained very green up to the time of harvesting. It is probable that this cane may be useful for late harvesting in the red valley soils.

In the Select Seedling Trial, 1st ratoons, the variety B.34104 was outstanding, both as regards tonnage and juice brix. This cane is a very good ratooner in the red and valley soils, where the rainfall is high.

CATEGORY D

The results are presented in Tables XIV—XVIII.

TABLE XIV.

SELECT SEEDLING TRIALS—PLANT CANES.

Estates and Dates of Harvesting:— Castle 30th and 31st March, Kendal 6th and 7th April, 1943.
Redland 9th and 10th April, Walkers 20th and 21st April, 1943.

Variety	TONS CANE PER ACRE								TONS SUGAR PER ACRE								% SUCROSE IN CANE								QUOTIENT OF PURITY								No. ROTTEN CANES PER PLOT								Variety
	Castle		Kendal		Redland		Walkers		Castle		Kendal		Redland		Walkers		Castle		Kendal		Redland		Walkers		Castle		Kendal		Redland		Walkers		Castle		Kendal		Redland		Walkers		
	Group I	Group II	Group I	Group II	Group I	Group II	Group I	Group II	Group I	Group II	Group I	Group II	Group I	Group II	Group I	Group II	Group I	Group II	Group I	Group II	Group I	Group II	Group I	Group II	Group I	Group II	Group I	Group II	Group I	Group II	Group I	Group II	Group I	Group II	Group I	Group II	Group I	Group II	Group I	Group II	
B.3439	—	—	—	41.12	—	—	—	—	—	—	—	6.78	—	—	—	—	—	—	—	16.5	—	—	—	—	—	—	—	87.6	—	—	—	—	—	—	—	12	—	—	—	—	B.3439
B.34104 ..	27.29	—	44.14	—	47.12	—	23.43	—	5.64	—	7.57	—	7.67	—	3.51	—	18.5	—	17.2	—	16.3	—	14.8	—	92.1	—	91.4	—	90.2	—	83.1	—	34	—	57	—	136	307	—	—	B.34104
B.35187 ..	—	31.21	—	44.71	52.59	—	—	12.25	—	5.35	—	6.64	8.17	—	—	1.51	—	17.2	—	14.9	15.5	—	—	12.3	—	89.9	—	88.6	89.6	—	—	79.4	—	29	—	38	35	—	—	126	B.35187
B.35245 ..	30.30	—	39.27	—	40.07	12.07	—	—	4.88	—	7.64	—	6.70	1.78	—	—	17.5	—	17.2	—	—	16.7	14.6	—	92.1	—	92.6	—	—	92.1	84.9	—	16	—	29	—	38	135	—	—	B.35245
B.37161 ..	38.26	42.89	47.43	44.44	53.70	52.49	30.43	30.06	7.11	7.12	7.59	6.90	8.47	8.37	4.09	3.80	17.6	16.6	16.0	15.5	15.8	15.9	13.7	12.6	92.6	90.1	91.0	89.0	90.1	91.1	82.2	80.5	12	10	24	26	26	31	169	157	B.37161
B.34110 ..	—	—	21.75	—	—	44.24	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	71	—	—	30	—	—	B.34110
B.37193 ..	—	—	—	43.06	—	51.82	25.63	—	—	—	—	6.51	—	7.58	3.35	—	—	—	—	15.2	—	14.7	13.0	—	—	—	—	—	—	87.7	81.5	—	—	—	—	18	—	31	274	—	B.37193
B.38209 ..	35.91	—	30.87	—	14.48	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	30	—	93	—	289	—	—	—	B.38209
B.39157 ..	—	28.71	—	35.77	—	—	—	21.11	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	8	—	11	—	—	171	—	B.39157
B.39171 ..	28.63	—	30.40	—	31.49	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	57	—	79	—	104	—	—	—	B.39171
B.39177 ..	—	36.64	—	31.34	16.54	—	—	20.56	—	6.81	—	5.02	2.49	—	—	3.12	—	18.6	—	16.0	14.6	—	—	15.1	—	89.7	—	86.6	87.1	—	—	82.9	—	20	—	97	278	—	180	—	B.39177
B.39184 ..	—	—	—	—	—	43.46	7.62	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	38	224	—	B.39184
B.39200 ..	29.03	—	24.89	—	—	7.17	18.67	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	22	—	135	—	—	331	350	—	B.39200
B.39207 ..	—	27.94	—	—	—	—	13.07	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	48	—	—	—	—	133	—	B.39207
B.39211 ..	32.28	—	37.02	—	—	30.33	7.56	—	5.67	—	5.41	—	—	4.13	0.92	—	17.2	—	14.6	—	—	13.6	12.4	—	88.5	—	84.3	—	—	86.4	74.1	—	36	—	—	—	192	243	—	B.39211
B.39220 ..	—	—	29.60	—	—	—	3.17	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	74	—	—	—	198	—	B.39220
B.39222 ..	—	28.80	—	35.14	28.43	—	—	14.25	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	29	—	42	171	—	185	—	B.39222
B.39237 ..	—	28.99	—	40.69	40.90	—	—	11.78	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	45	—	26	41	—	—	132	B.39237
B.39240 ..	27.94	—	40.17	—	38.57	—	13.49	—	4.82	—	6.49	—	6.33	—	1.85	—	17.0	—	16.2	—	16.4	—	13.8	—	90.4	—	89.8	—	89.6	—	81.2	—	38	—	20	—	79	—	148	—	B.39240
B.4092	—	—	—	—	—	—	—	11.08	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	314	B.4092
B.4094	—	35.64	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	57	—	—	—	—	—	—	B.4094
B.40118 ..	—	—	—	—	—	—	—	29.46	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	259	B.40118

The following differences between mean yields may be considered significant:—

Redland	Group I	± 1.04 tons sugar/acre	
		± 5.20 tons cane/acre	
	Group II	± 1.13 tons sugar/acre	
		± 8.12 „ cane/acre	
Walkers	Group I	± 1.22 tons sugar/acre	
		± 6.59 „ cane/acre	
	Group II	± 1.06 tons sugar/acre	
		± 8.80 „ cane/acre	
Kendal	Group I	± 0.92 tons sugar/acre	
		± 5.31 „ cane/acre	
	Group II	± 0.93 tons sugar/acre	
		± 5.21 „ cane/acre	
Castle	Group I	± 0.67 tons sugar/acre	
		± 3.55 „ cane/acre	
	Group II	± 0.59 tons sugar/acre	
		± 3.76 „ cane/acre	

TABLE XV

Select Seedling Trials — 1st Ratoons

Estates and Dates of Harvesting : Guinea 29th April, 1943; Andrews 2nd „ „; Society (Maturity) 27th „ „

Variety	Tons Cane per Acre			Z.H.R. Brix			No. Rotten Canes/Plot		
	Guinea	Andrews	Society	Guinea	Andrews	Society	Guinea	Andrews	Society
B.H.10(12)	32.85	34.21	34.94	24.1	22.9	23.5	23	25	42
B.726 ..	—	34.90	33.91	—	23.6	22.9	—	47	58
B.3013 ..	34.43	—	31.41	24.7	—	23.7	15	—	18
B.34104 ..	48.99	50.79	63.85	23.0	23.7	24.4	50	69	25
B.35187 ..	38.27	—	50.27	21.6	—	21.8	15	—	12
B.35245 ..	—	45.15	42.48	—	24.2	23.3	—	27	24
B.37161 ..	—	—	66.00	—	—	22.8	—	—	12
B.38155 ..	—	—	50.13	—	—	24.5	—	—	16
B.38212 ..	43.82	—	53.07	23.0	—	24.6	11	—	14

The following differences between mean yields may be considered significant :—

Guinea .... ± 7.02 tons cane per acre
Andrews .... ± 8.07 „ „ „ „
Society .... ± 5.98 „ „ „ „

Estates and Dates of Harves

Variety	Tons Cane per Acre						
	Easy Hall		Claybury		Pool	Easy Hall	
	Group I	Group II	Group I	Group II		Group I	Grou
B.H.10(12)	—	32.25	—	22.26	28.73	—	23
B.726 ..	—	—	—	—	22.62	—	-
B.3013 ..	27.94	—	24.97	—	31.39	22.8	-
B.37161	42.69	46.07	47.13	56.42	62.72	21.2	2

The following differences between mean

Easy Hall { Group I ±
Group II ±

Claybury { Group I ±
Group II ±

Pool .... ±

TABLE XVI

ng Trials — 2nd Ratoons

ting:— Easy Hall — 15th April, 1943
Claybury — 7th April, 1943
Pool (Maturity) — 28th April, 1943

Z. H. R. Brix				No Rotten Canes per Plot				
	Claybury		Pool	Easy Hall		Claybury		Pool
ıp II	Group I	Group II		Group I	Group II	Group I	Group II	
3.4	—	22.1	23.5	—	25	—	175	14
—	—	—	23.7	—	—	—	—	29
—	22.8	—	23.3	18	—	83	—	10
2.4	21.9	22.4	22.9	13	18	15	31	9

yields may be considered significant:—

2.71 tons cane/acre
7.57 tons cane/acre

4.32 tons cane/acre
4.92 tons cane/acre

2.01 tons cane/acre

TABLE XVII

Select Seedling Trials — 4th Ratoons

Mount Wilton — Harvested 21st April, 1943

Variety	Tons Cane/Acre		Z. H. R. Brix		No. Rotten Canes/Plot	
	Early Group	Late Group	Early Group	Late Group	Early Group	Late Group
B.726 ..	19.32	—	23.5	—	67	—
B.H.10(12)	—	24.03	—	22.9	—	12
B.3419 ..	13.51	13.70	22.5	21.8	15	9
B.35187 ..	30.98	28.88	22.0	22.8	18	21
B.35245 ..	30.16	27.82	23.9	22.9	49	8

The following differences between mean yields may be considered significant :—

Early Group ± 5.88 tons cane/acre
Late Group ± 9.34 tons cane/acre

Co-operative Variety Trials — 2nd Ratoons

Estates and Harvesting Dates :—
Ashbury .... 8th March, 1943
Clifton Hall .... 18th March, 1943
Horse Hill .... 24th March, 1943
Farmers .... 29th March, 1943
Mount Wilton .... 22nd March 1943

riety	Tons Cane per Acre					Z. H. R. Brix				
	Ashbury	Clifton Hall	Horse Hill	Farmers	Mount Wilton	Ashbury	Clifton Hall	Horse Hill	Farmers	Mount Wilton
.10(12)	37.48	—	—	33.81	—	20.8	—	—	22.3	—
13 ..	—	33.68	30.00	—	35.39	—	22.4	22.9	—	22.3
187 ..	42.06	32.15	39.45	38.99	45.35	19.2	19.6	21.3	20.6	20.1
245 ..	—	34.68	37.93	—	40.15	—	22.7	22.6	—	22.0

The following differences between mean yields may be considered significant :—

Ashbury .... ± 0.80 tons cane/acre
Clifton Hall .... Insignificant
Horse Hill .... ± 3.25 tons cane/acre
Farmers .... ± 2.29 tons cane/acre
Mount Wilton .... ± 2.88 tons cane/acre

In the Select Seedling Trials, plant canes, the standard variety B.37161 gave the highest cane tonnages except at Kendal, where it was beaten by B.35187. The difference in yield here may, however, have quite easily been due to chance. The seedling B.37193 gave good tonnages at Kendal and Redland, although the sucrose content of this cane was not as high as B.37161 or B.34104. The variety B.37161 gave the highest sugar yields except at Kendal in Group I, where it was beaten by the variety B.35245. The difference was, however, insignificant.

In the Select Seedling Trials, 1st ratoons, the varieties B.34104 and B.37161 were outstanding.

In the Select Seedling Trials, 2nd ratoons, the variety B.37161 gave yields that were about double those given by the standard varieties B.H. 10(12), B.726 and B.3013.

In the Select Seedling Trials, 4th ratoons, the varieties B.35187 and B.35245 were definitely superior to the standard varieties B.726 and B.H. 10(12), while the variety B.3419 was definitely inferior.

In the Co-operative Variety Trials, 2nd ratoons, the varieties B.35187 and B.35245 proved to be generally better than the standard varieties B.H. 10(12) and B.3013.

CATEGORY E

The results are presented in Table XIX.

TABLE XIX

Select Seedling Trials — 1st Ratoons

Estate — Six Mens. Harvested 3rd February, 1943

Variety	Tons Cane per Acre	Z.H.R. Brix	No. Rotten Canes/Plot
B.2935 ..	29.79	19.7	4
B.3439 ..	30.34	21.4	8
B.37161 ..	30.86	21.5	6
B.34104 ..	32.62	22.1	3
B.38155 ..	26.67	22.1	5
B.38209 ..	30.96	21.4	5
B.40118 ..	38.42	20.1	3

A difference between mean yields of ± 5.67 tons per acre may be considered significant.

The variety B.40118 gave the highest yield of cane, and the variety B.38155 the lowest. The difference between the other varieties was, however, insignificant. The good performance of B.34104 in this category is noteworthy.

IV. SUGAR CANE VARIETAL PLANTING IN BARBADOS

By the Sugar Cane Census Act, 1937 (1937-31), all plantations (i.e. units of more than ten acres arable land) are required during the month of September to make a return giving the acreage of cane to be reaped during the subsequent crop and the acreage of each variety. Precise variety acreage figures are therefore available for plantations from the 1938 crop to the 1944 crop inclusive. Figures are also available for the 1936 and 1937 crops from voluntary returns which actually comprised almost ninety per cent. of plantation canes in those years. The trend in the varietal situation is therefore actually seen in the Table below.

Variety	Crop Year 1934–1936	1935–1937	1936–1938	1937–1939	1938–1940	1939–1941	1940–1942	1941–1943	1942–1944
B.H.10(12)	29.27	28.28	27.23	25.97	23.15	22.16	19.81	12.69	8.00
B.726 ..	29.82	27.64	26.74	21.98	19.48	17.33	15.64	9.58	4.79
B.2935 ..	29.19	38.24	39.30	42.10	43.01	45.66	42.45	20.95	4.73
Ba.11569	8.18	3.10	..	..	..	..	..	..	..
B.891 ..	1.32	0 37	..	..	..	..	..	..	..
Mixed ..	2.22	1.28	2.91	2.09	3.90	2.97	2.90	3.45	3.79
B.3013 ..	..	0.64	3.82	6.98	8.26	8.58	8.42	5.84	2.90
B.417 ..	..	0.20	..	..	..	..	..	..	..
B.381 ..	..	0.25	..	..	..	..	..	..	..
B.3127 ..	..	..	..	0.88	2.20	3.30	3.33	..	..
B.3439 ..	..	..	..	..	..	..	3.60	8.35	9.49
B.37161 ..	..	..	..	..	..	..	1.48	26.77	48.69
B.35187 ..	..	..	..	..	..	..	2.37	10.19	11.28
B.35245 ..	..	..	..	..	..	..	..	1.85	2.06
B.34104 ..	..	..	..	..	..	..	..	0.33	4.19
	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00

In the lower rainfall district, B.2935 by 1938 had completely replaced Ba.11569 and B.891. B.H.10(12) was the red-soil (high rainfall district) standard main crop cane, while B.726 functioned as an early red soil variety and extended also into the intermediate rainfall district. From 1937, B.3013 replaced in part both of these varieties.

The crop of 1942 saw the start of a rapid replacement of all these varieties, partly by B.3439 (black soils) and B.35187 (red soils) but above all and universally by B.37161. This seedling, in the course of three seasons, has come to occupy almost fifty per cent. of the cane acreage, displacing almost entirely B.2935, B.726 and B.H.10(12). Its great vigour and universal adaptability will probably result in its occupying a still higher percentage. The seedling B.34104 is showing special suitability for valley, intermediate black and red soils and is likely to increase by replacing B.726, B.H.10(12) and B.35187.

The great value of B.37161 was seen in the 1943 crop when, with some 3,000 acres of cane land given over to food crop growing and after a below average annual rainfall during 1942, a sugar crop of 133,000 tons was made—the second highest crop on record.

V. IMPORTATION OF NEW BREEDING MATERIAL

In accordance with the breeding policy of extending the degree of variability of expression of characteristics in seedling progenies, further importations of representatives of sugar cane species and species of nearly related genera were continued.

The material to be described below was obtained through Dr. Brandes, as a result of consultations with the Geneticist of the Station at the Sixth Meeting of the International Society of Sugar Cane Technologists in Louisiana in 1938 The material comprises original species and varieties within species collected by United States Department of Agriculture expeditions to Central and Eastern Asia and the Pacific Islands.

Further material imported during recent years includes varieties derived in Queensland and Florida by crossing species obtained in the expeditions referred to above with commercial varieties.

In listing and making notes* on the varieties in the Station's recent collections, a division is made into (a) naturally occurring species, (b) varieties derived from breeding, and (c) miscellaneous.

A. NATURALLY OCCURRING SPECIES

Saccharum spontaneum

Burma	Imp. 848	Burma
Pasoeroean....	Imp. 555	Java
Kloet	Imp. 564	Java
Tabongo	Imp. 578	Northern Celebes

The species *Saccharum spontaneum* is very variable and has a wide range, the variants covering a great range of soil and climatic conditions. The varieties found in India are rather small, with slender stalks. The Station has already imported and used as breeding material in this group the varieties Coimbatore Local, Dacca, and Gerhra Bhon. These have been crossed with local noble canes, and the first-named at present is showing promise of giving seedlings suitable to our conditions.

Of the new importations listed above, the variety Burma is found in Burma and Mandalay, and is held to be the most magnificent variety of the *spontaneums.* Its stalks are about the same size as those of the larger *spontaneums* from Java. They are very erect, growing to about twenty feet high, and do not lodge. One feature which appeals is that it possesses the longest growing season of the *spontaneum* varieties, and it is for this reason that particular attention in breeding will be paid to it. Its chromosome number ($2n = 96$) is intermediate between that of the Indian forms and the Java and Sumatra forms, their numbers being respectively $2n = 70$ and $2n = 112$. The Burma form has already been used elsewhere in breeding with other species of sugar cane, and the hybrid seedlings are said to be very promising.

The other varieties of *S. spontaneum* listed above occur in insular areas west of the Wallace Line. The varieties of *S. spontaneum* in this area fall into two groups, i.e. (a) in Java, Sumatra and Borneo occur larger types exemplified by

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* These notes are largely based on a paper given at the 6th Congress of the International Society of Sugar Cane Technologists—Brandes, E. W.: Sartoris, G. B. and Grassl, C. O., "Assembling and Evaluating Wild Forms of Sugar Cane and Closely Related Plants." Proc. 6th Cong. I.S.S.C.T., 1938, pp. 128—153.

Pasoeroean and Kloet (chromosome number 2n = 112). These two varieties are somewhat similar in size and appearance, and are the next largest of the *spontaneums* to the Burma form. It is from these varieties that the comparatively recent P.O.J. canes of commerce have been derived. Some of their nobilised derivations have already been used for breeding in Barbados, e.g. Kassoer, P.O.J.2364, P.O.J.2725 and P.O.J.2878. These all tend to a short season habit, which, while quite suitable to a short and intensive growing season, does not suit the longer growing season of the West Indies, where approximately half of the season experiences dry conditions. For our purpose, however, they possess such virtues as very rapid growth and resistance to mosaic disease. (b) This group comprises somewhat smaller forms of *spontaneum* which occur in Northern Celebes, Philippines, New Guinea, and southeast China; their chromosome number is 2n = 80. Of this group, Tabongo is the dominant type.

Saccharum robustum

28 N.G.105....	....	Imp. 654	Terr. Papua
28 N.G.251....	....	Imp. 496	Terr. Papua

These are found in New Guinea, Bismark Archipelago and the New Hebrides. Their habitat is essentially along river banks, where they are periodically inundated. Under these conditions they produce long stolons, which send up vertical shoots at intervals. This characteristic has not been found away from their natural habitat. They also occur, but only sporadically, at more elevated and drier areas.

They are robust types, and have stalks about the diameter of medium-thick canes of commerce. The stalks are about 2½ cms. in diameter, very hard, and 25—30 feet high. They tend to have a pith cavity, although varieties do occur with solid stalks. Their chromosome number is 2n = 84. The variety 28 N.G.251 is very promising as a parent cane and hybrid seedlings have already been obtained in Hawaii, Australia and the U.S.A. (Florida). The seedlings are said to inherit the vigour of the wild cane, and to produce thick stalks of great length. *Saccharum robustum* is susceptible to mosaic, but is said to suffer only slight injury from the disease.

Seedlings of these varieties have already been obtained in Barbados, but it is too early yet to make any forecast as to their possible usefulness.

Position Doubtful

28 N.G.219....	....	Imp. 975	New Guinea
Fiji 1	....	Imp. 860	Fiji Islands
Fiji 3	....	Imp. 862	Fiji Islands
N.C.100	....	Imp. 918	Northern New Caledonia

These wild varieties are of very doubtful taxonomic position, chiefly on account of the fact that the flowers upon which the taxonomic position is ascertained have not been seen.

The first listed resembles *Saccharum robustum*, although the flesh of the cane is red. It is said to be a variety of great vigour. The two varieties from Fiji occur naturally on hillsides, and have an appearance somewhat like *Saccharum robustum*. The variety from Northern New Caledonia is a small plant with tender green erect stalks, which branch somewhat like a bamboo.

Erianthus arundinaceus

28 N.G.7	....	Imp. 631	Terr. Papua

Erianthus maximus

Raiatea	....	Imp. 923	Society Islands
N.C.132	....	Imp. 921	New Caledonia

The species of *Erianthus* are very interesting because they are closely related to the genus *Saccharum,* and they have already been used in generic crosses with the species of the genus *Saccharum.* No hybrids of commercial value have yet been obtained. The species of *Erianthus,* however, cover a wide range of ecological conditions, and for this reason may be of value as breeding material.

B. VARIETIES DERIVED FROM BREEDING

Saccharum officinarum

C.P.36—154	....	....	Black Fiji x Hinds Special

1st nobilised *Saccharum robustum*

C.P.32/156	....	....	Otaheite x 28 N.G.251
32 M.Q.579	....	....	Badila x 28 N.G.251
32 M.Q.135	....	....	Badila x 28 N.G.251
32 M.Q.629	....	....	Badila x 28 N.G.251
32 M.Q.657	....	....	Badila x 28 N.G.251
C.P.36—144	....	....	Louisiana Purple x 28 N.G.251
C.P.36—145	....	....	Louisiana Purple x 28 N.G.251
C.P.36—134	....	....	Black Fiji x 28 N.G.251
C.P.36—137	....	....	Crystalina x 28 N.G.251
C.P.31—517	....	....	D.74 x 28 N.G.251
C.P.36—127	....	....	Louisiana Purple x 28 N.G.105
C.P.36—133	....	....	Louisiana Purple x 28 N.G.218

Saccharum officnarum x *Saccharum robustum* x *S. spontaneum (Java glagah)*

C.P.36—158	....	....	P.O.J.2725 x 28 N.G. 251
C.P.36—156	....	....	P.O.J.2725 x 28 N.G. 251

Saccharmum officinarum x *Erianthus arundinaceus*

C.P.36—116	....	....	Louisiana Purple x 28 N.G. 7

The above list comprises essentially seedlings derived in Queensland and Canal Point, Florida, from local commercial canes crossed with varieties of *Saccharum robustum.* According to Dr. Brandes and his technical officers, these seedlings are vigorous, large-stalked, and resistant to leaf-spotting diseases such as eye-spot, brown-spot, and brown-stripe. The majority, however, are susceptible to red rot and mosaic disease, and for this reason it is apparent that they will have to be crossed with derivatives from lines showing resistance to these two major diseases.

C. MISCELLANEOUS

Co.419
Co.421
P.O.J.213

All have recently been imported from the Plant Quarantine Station in Trinidad, the first two named on account of their having already shown appreciable promise in variety trials in Trinidad, and the last being re-introduced (after being lost to Barbados) in view of some of its derivatives produced in Barbados showing desirable growth-type characteristics.

CONCLUSIONS.

Nobilisation work carried out on material introduced into Barbados over a decade ago has already reached a stage where its results are of commercial importance. It was thought, however, that since this work had been highly

successful and had been taken to an extent where the commercial possibilities were known and the failures had been eliminated, the time was opportune to develop nobilisation work on fresh material. It is considered that the material collected by the United States Department of Agriculture and listed above provides an opportunity of breaking new ground in the nobilisation work.

It is therefore the intention to develop the new nobilisation work concurrent with the exploitation of the nobilisation work started just prior to the formation of the Station and during its earlier years.

VI. DESPATCH OF SEEDLINGS TO PLANT QUARANTINE STATION

During the year under review the following seedlings were sent by the Station to the Plant Quarantine Station:—

(a) *For eventual distribution to all contributing colonies*

B.4096
B.4098
B.40100
B.40102
B.40105
B.40116
B.3915
B.39180

(b) *For distribution to Jamaica only*

B.4029
B.40126
B.40130
B.40133
B.40152
B.40164
B.40174

(c) *For distribution to Jamaica, Antigua and Trinidad*

B.4091
B.40108
B.40117
B.4097
B.4099
B.40112
B.40114

Of this list, probably B.4098 is outstanding, although in general it is premature to make any forecast at this stage as to the probable outcome of any of the seedlings listed.

VII. PERFORMANCES OF SEEDLINGS IN CONTRIBUTING COLONIES

TRINIDAD

A variety sub-committee of the Trinidad Sugar Cane Investigation Committee has proved an effective organization for the receipt of the Station's seedlings from the Plant Quarantine Station and for their bulking and distribution to chosen estates for preliminary observation. This Committee in the course of its preliminary selection work with seedlings is assisted in its conclusions by recommendations from the Station.

Consequent on the soil investigations of the sugar cane areas carried out by Charter and Turner, the ecological areas have been defined and a system of selecting and testing seedlings in each of the main areas standardized.

The Station in Barbados, in the course of its selection work for Trinidad, is attempting to forecast the types of seedlings likely to succeed in each of these areas, and with continuity of the work such forecasts will become more accurate.

The executive work in connection with the testing of our seedlings in Trinidad has been under the immediate control of the Sugar Agronomist of the Department of Agriculture, now the Sugar Agronomist to the Inspector General of Agriculture, Mr. P. E. Turner. His summary of the varietal experiments reaped in Trinidad in 1943, with his conclusions and recommendations for commercial plantings, is given here.

PRELIMINARY RESULTS OF VARIETAL EXPERIMENTS REAPED IN TRINIDAD IN 1943

Thirty-nine varietal experiments were reaped in 1943. Included in the experiments were twenty-nine varieties (twenty-one from Barbados, four from Coimbatore and four from elsewhere). Five of the varieties (B.37161, B.37172, B.37193, B.37219 and B.37259) were reaped in formal trials for the first time.

SOIL GROUPS UNDER EXPERIMENT

The varietal experiments were laid down on the four environmental soil groups on which sugar cane is extensively grown. A list of the soil types included in each group is recorded in page 225 of the Annual Report for 1942 of the Sugar Agronomist on Field Experiments on Sugar Cane in Trinidad.

Flat Areas

Group I. Soils with no shortage of water during the dry season.

Group II. Soils with a distinct shortage of water during the dry season.

Undulating Areas

Group IV. Soils with moderate reserves of subsoil water during the dry season.

Group V. Soils with low reserves of subsoil moisture during the dry season.

RESULTS OF PREVIOUS EXPERIMENTS

As a result of the experiments reaped during 1941 the standard varieties B.H.10(12) and Co.213 are being replaced very largely by B.34104 and to some extent by B.3439.

The variety B.3337 showed great promise as plants in the experiments reaped during 1942.

RESULTS OF EXPERIMENTS REAPED IN 1943

VARIETIES UNDER TRIAL FOR FIRST TIME

B.37172. The variety B.37172 has given outstanding results on the three typical soil series of Groups I and II on which it has so far been tried.

On silty loam of Orange Grove Series (Group I) it has given much larger yield of plant cane than B.3337 and B.34104. (Quality data are not available for this experiment).

On silty loam of Washington Series (Group II) it has given much larger yield of plant sugar than B.3337 and B.37161.

On clay of Sevilla Series (Group II) it has given much larger yield of plant sugar than B.37161 and B.34104.

B.37161. This variety has been under trial on four typical soils of Group II.

On silty loam of Washington Series it has given inferior yield of plant sugar to B.37172 and B.3337.

It has given inferior yield of plant sugar to B.37172 on clay of Sevilla Series and to B.3337 on clay of Frederick-Sevilla Association.

It has given superior yields as plants to B.34104 on Washington, Recovery and Sevilla Series and to B.3337 on Frederick-Sevilla Association.

B.37193. This variety has been under trial on five typical soils of Group II.

On silty loam of Washington Series, and clays of Pasea, Recovery and Sevilla Series and of Frederick-Sevilla Association, it has given inferior yield as plants to B.37172, B.37161, B.3337 or B.34104.

B.37259. This variety has been under trial on two soils of Group II.

It has given inferior yield as plants to B.37161, B.3337 or B.34104 on clays of Pasea and Sevilla Series.

VARIETIES PREVIOUSLY UNDER TRIAL

B.3337. This variety has been under trial on two soils of Group I (Orange Grove Series and Orange Grove-Pasea transition), seven soils of Group II (silty loams of Washington Series, and clays of Recovery, Cunupia, Waterloo, Sevilla and Frederick Series and of Frederick-Sevilla Association), and two soils of Group V (clays of Phoenix-Brechin Association and Ste. Madeline Suite).

On soils of Group I and II it has given inferior yields as plants to B.37172 or B.37161.

On soils of Groups I and II it has proved superior in yield of plants and ratoons to B.34104, except on Waterloo Series (Group II) where it tied with B.34104.

On soils of Group V it has given superior yield of plant and ratoon sugar to B.34104.

B.X. This variety, which has been under trial on eight soils of Groups I, II and IV in general has been good yields of cane but juice of very poor quality.

STANDARD VARIETIES

B.34104. This variety has been found inferior, with unimportant exceptions, to B.37172, B.37161 or B.3337 on ten soils of Groups I, II and V. Comparisons with these varieties on Group IV will be available in 1944.

B.3439. This variety has been found in general inferior to B.34104 on all four soil groups.

CONCLUSIONS AND RECOMMENDATIONS

VARIETIES FOR STANDARD USE

The trash of B.3337 is of firmer texture than that of B.34104, which adds to the difficulties of weeding, and, unless the cane is burnt, of reaping. Nevertheless it would be to the general advantage to extend B.3337 at the expense of B.34104 on the soils of Groups I, II and V. Information as to the relative merits of the two varieties on soils of Group IV will be available in 1944.

B.34104 gives more satisfactory results than B.3439 on soils of Group IV.

The variety Co.213 should be retained on areas of low productivity such as Brechin Series (Group V) until the results of formal experiments on such soils are available.

VARIETIES SHOWING PROMISE

B.37172 and possibly B.37161 may become standard varieties in the future. Limited areas should be planted in both varieties to provide a source of supply for any future need.

COMMERCIAL PLANTINGS IN TRINIDAD

A survey of the proportional distribution of sugar cane varieties reaped on estates in Trinidad during 1943 indicates that the varieties B.H.10(12), Co.213, B.34104, Uba and B.3439 were the most important, occupying, of the area reaped, the following respective percentages:—48.47%, 24.37%, 8.15%, 4.17% and 4.05%. Within recent years on estates in Trinidad there has been a very quick variety change-over (in so far as the extensive ratooning will permit). In the first place, Uba gave way largely to Co.213. This was followed by B.3439 and B.34104 displacing B.H.10(12) firstly on its marginal areas and subsequently even on a large part of its better areas, and also to some extent replacing Co.213. These statements are confirmed by an examination of the following tables, which indicate clearly the rapid swing to the planting of B.3439 and particularly B.34104.

TRINIDAD

ACREAGES OF VARIETIES REAPED ON ESTATES IN 1943

Variety	Plants	1st Ratoon	2nd and other Ratoon	Standover	Total
B.H.10(12)	2789.56	3143.11	3447.17	64.50	9444.34
Co.213 ..	1378.67	1685.18	1654.86	28.25	4746.96
B.34104 ..	1366.28	166.36	12.00	44.00	1588.64
B.3439 ..	557.53	162.28	58.49	11.25	789.55
Uba ..	—	—	813.26	—	813.26
Others ..	873.23	618.26	446.04	162.25	2099.78
Total ..	6965.27	5775.19	6431.82	310.25	1982.53

The areas under ratoon cane are larger than normal.

Percentages of Plants and Ratoons Reaped on Estates in 1943

Variety	Plants	1st Ratoon	2nd and other Ratoon	Standover	Total %
B.H.10(12)	29.54	33.28	36.50	0.69	100
Co.213 ..	29.05	35.49	34.84	0.62	100
B.34104 ..	86.01	10.43	0.74	2.82	100
B.3439 ..	70.62	20.49	7.41	1.48	100
Uba ..	—	—	100.00	—	100
Others ..	41.60	29.43	21.26	7.71	100
Total ..	35.76	29.64	33.01	1.59	100

The percentage of ratoons are larger than normal.

ST. KITTS

Ecological areas in St. Kitts, in so far as variety allocations are concerned, are comparatively straightforward, being based chiefly on the two factors rainfall and altitude. It was originally considered, and subsequent experience seems to confirm this in so far as seedlings are concerned, that St. Kitts closely resembles Barbados, and recommendations can be made almost directly for St. Kitts. The Station therefore has adopted the policy of sending to St. Kitts only seedlings which are of distinct promise for Barbados conditions. The actual testing work is under the control of Mr. Turner, whose summary of the situation, following on the 1943 trials, is given here.

Drier lower lands

B.3439 gave plants of better quality and somewhat larger yields of plant sugar than B.37161 when reaped early in the crop season. These varieties gave approximately equal yields of plant sugar when reaped late in the crop season but B.3439 tended to maintain superiority in quality.

B.2935 was greatly inferior to B.3439 and B.37161 in yield of cane and sugar whether reaped early or late.

B.35245 was inferior to B.3439 and B.37161 in yield of cane and sugar when reaped early.

Wetter lower lands

B.37161 gave much larger yields of plant cane and sugar than B.3439 and B.2935 whether reaped early, in mid crop, or late, although under some conditions B.37161 was greatly inferior to B.3439, but not to B 2935, in quality.

There was not much to choose between the yields of B.37161 and B.34104 as plant cane, but B.37161 tended to be superior in quality for mid-crop reaping.

B.35187 and B.35245 were inferior to B.37161 and B.34104 in yield of plant cane and sugar, and in quality, when reaped in mid-crop.

Wet Middle Lands.

B.37161 and B.35187 were greatly superior in yield of plant cane and sugar to B.H.10(12) and B.3013 for both earlier and later reaping.

B.37161 gave a much larger yield of plant sugar than B.35187 when reaped early but the difference in favour of B.37161 lessened as the reaping season progressed. In one experiment which was reaped late, B.35187 gave a larger yield of plant sugar than B.37161. B.35187, in contrast to B.37161, does not arrow, a most important character in favour of B.35187 on the middle (and upper) lands.

Wet upper lands

B.35245 gave larger total yields of plant and ratoon cane and sugar on one area, and B.37161 and B.35245 larger yields of plant cane and sugar on another area, than B.3013 and B.H.10(12).

Commercial Plantings in St. Kitts

Prior to the functioning of the Station the varieties Ba.11569 in the low rainfall and B.H.10(12) in the high rainfall areas were predominant. Considerable alarm was caused by the former contracting gumming disease, but one of the early varieties distributed from the Station, B.2935, which in addition to being very much better than Ba.11569 in its sugar yields possessed also very much higher resistance to this disease, arrived opportunely to replace it. Within recent years B.3439 has tended to replace B.2935, more especially in the drier districts, while now B.37161 will certainly replace entirely both B.2935 and B.3439 in the wetter lower lands, and B.3439 as a late cane in the drier lower lands, while B.37161 with B.35187 will probably come to replace B.H.10(12) on the wet middle and upper lands.

ANTIGUA

The determination of the ecological areas in Antigua has been greatly assisted by the soil investigations conducted by Charter, which have helped to bring about order out of the chaos of soil types which exist in that Island. Unlike St. Kitts, soil type in Antigua is the basic factor determining ecological areas, with rainfall contributing to a much lesser degree than is usual in most other Islands.

In Antigua the organization for the reception of the Station's seedlings, their multiplication, primary testing, and final trials, in view of the multiplicity of soil types, is very good indeed. Great progress from the varietal point of view has been made from the time when Antigua grew largely the old variety B.4507 and to a smaller extent B.H.10(12).

In view of the many soil types experienced in Antigua, it has been the policy of the Station to send a large number of seedlings there, comprising a wide range in growth-types, and it is greatly to the credit of the authorities conducting the work in Antigua that they have coped effectively with the testing of such a large number and have changed the commercial variety situation from what was undoubtedly a very poor one to a very good one.

In view of the large numbers of seedlings received by Antigua, and in order not to risk losing any good ones, a system whereby observation trials have been interpolated between the bulking stage and large scale trials proper has been functioning. These observation trials are laid out to cover the major soil types, and greatly assist in deciding on those seedlings which are worthy of trial in the large-scale trials.

In the calcareous limestone soils of the lower rainfall areas the varieties B.4507 and Ba 11569 have in turn given place to B.2935, then B.3439, and now most probably to B.34104. In the heavier soils it is probable that Ba.11569, B.2935, B.H.10(12), and Co.213 will all be replaced by B.34104.

Mr. Turner's recent recommendations with regard to varietal plantings on the various soil types are set out here.

RESULTS OF VARIETAL EXPERIMENTS IN ANTIGUA.

It is recommended that varieties be planted on the various soil types as set out below:—

Wetherell clay....	....	B.34104
Gunthorpe clay	....	B.34104
Tomlinson clay	....	B.34104
Bendal clay	....	B.34104
Lindsey clay	....	B.34104
Otto clay	....	B.3439 and B.34104 equally
Fitches clay	....	B.3439

Preference should be given to B.3439 for reaping early in the crop season as it tends to ripen more rapidly than B.34104.

B.35187 and B.37161 may become standard varieties on certain soil types. Limited areas should be planted in both varieties (preferably B.35187) on calcareous Gunthorpe clay and B.37161 on Lindsey and Fitches clay) in case of future need.

B.37172 has shown promise in observation plots on Lindsey clay.

JAMAICA

An ecological classification of the sugar cane areas in Jamaica has already been made, and serves as a basis for allocating and testing seedlings. Superimposed, however, upon the requirements for ecological areas is the necessity for commercial resistance to mosaic disease. This factor naturally greatly complicates the problem, and as indicated elsewhere a standardized method of dealing with this problem has yet to be achieved. It is felt that until the mosaic disease problem is rationally investigated, with Jamaica and the Station working on common lines, there will be no satisfactory varietal situation in Jamaica.

Recently, the work on sugar cane variety testing in Jamaica has been made the responsibility of the research organization of the Jamaica Sugar Manufacturers' Association. A variety sub-committee of the Jamaica Sugar Cane Technologists' Association has been formed, the members being responsible for preliminary selection of seedlings from bulking plots, their despatch to considered approved areas, their growing and observation in these areas, and subsequent selection for inclusion in trials. This organization is more or less in its infancy, and it is yet early to get indications as to how it will work. Unfortunately, its activities have been greatly hampered by difficulty in transport.

In the meantime the number of variety trials conducted has definitely increased, and a survey of the results from trials reaped in 1943 indicates that B.34104 gives outstanding results in almost all ecological categories. This variety, however, is highly susceptible to mosaic disease, although there are strong indications that it is tolerant, and even on occasion may throw off the symptoms. Indeed, it is felt that the effect of the disease on B.34104 might well prove to be negligible. It is further felt, moreover, that provided B.34104 is supplemented by resistant varieties the position cannot be considered to be altogether unsatisfactory. It is, moreover, hoped that some of the more recently acquired seedlings which have performed well elsewhere, such as B.3337, B.35187, B.37161, and B.37172, in addition to reproducing their good performances in the other Islands will also show commercial resistance to mosaic disease in Jamaica. The variety B.3439, in spite of its being a noble cane, has shown marked resistance to the disease, and in addition in many of the ecological areas has given very high yields, and more especially first-class factory performances.

VIII. MOSAIC DISEASE INVESTIGATIONS

INTRODUCTION

Among the Islands served by the Station, sugar cane mosaic disease is of paramount commercial importance in Jamaica. In Barbados, while it has some commercial importance, its nature and the reaction of seedlings to it assume importance for the reason that the Station is located in Barbados and that wherever possible preliminary elimination of seedlings considered otherwise suitable to Jamaica should be done in Barbados on a basis of reaction to mosaic disease.

Mosaic disease is of comparatively little commercial importance in Trinidad and the Windward and Leeward Islands. Consequently the problem may be considered almost exclusively for Jamaica and Barbados.

Little or no fundamental work on such aspects of the disease as (1) its distribution as affected by climatic conditions and the incidence of vectors, (2) the existence of strains of the virus, and (3) the reaction of seedlings to the factors (1) and (2) has been carried out in either of these two Islands. It is clear that if a solution applicable to commerce is to be obtained, fundamental work will have to be carried out in both Islands. It is highly desirable that the fundamental situation is thoroughly understood, with a view to making an intelligent selection of seedlings in each Island, and more important still in standardizing eventually the methods employed for a routine testing of seedlings in Barbados prior to their despatch to Jamaica. In so far as the latter aspect is concerned, fundamental work carried out in both Islands according to some preconceived design common to both will be necessary, not only in establishing a suitable technique for each of the Islands concerned but for indicating the extent to which the work for Jamaica can be done in Barbados. This will be a subject for discussion between the Jamaica authorities and the

Geneticist and Assistant Botanist on their visit to Jamaica in early 1944.

In the meantime a start on fundamental investigations has been made in Barbados, the work being under the immediate control of the Assistant Botanist to the Station.

For several years now attempts have been made to evaluate individual seedling resistances, and, when sufficient numbers were available, the degrees of resistance to mosaic shown by crosses, by the method of field resistance trials. These have the advantage of giving results obtained under natural conditions, but are limited by the fact that the distribution of the disease may be irregular over the area employed and an appreciable time may elapse before a seedling is subjected to natural infection. Further, in the case of field resistance trials it cannot be emphatically stated that, should a seedling not show symptoms of the disease, it is of necessity commercially resistant.

On the other hand, artificial dissemination of the disease by inoculation of the virus, provided a satisfactory technique can be evolved, has the advantage of economy in time and material and is, moreover, well suited to investigation work on mosaic strains. In Louisiana, a very efficient technique for artificial transmission has been evolved and adopted as a routine in seedling raising work and in research on the existence of strains.

In this report, therefore, a short account is given of the field resistance trials, the aims and objects of the artificial transmission work, and the results achieved.

MOSAIC DISEASE FIELD RESISTANCE TRIALS

These were continued on the land of the Mental Hospital. Out of a total of two hundred and seventy-seven seedlings tested, fifty were found to be susceptible, while of the same number of check-stools of the susceptible and standard commercial variety B.2935 one hundred and thirteen were infected. Towards the end of the period under review the trials were replanted, comprising one hundred and sixty-nine seedlings, one hundred and eight being discarded; sixty-eight of which had not contracted mosaic.

INVESTIGATIONS ON ARTIFICIAL TRANSMISSION OF THE DISEASE

The Assistant Botanist experimented using the Sein method paying particular attention in addition to the actual technique involved, to environmental factors such as light intensity, degree of shading, and time of inoculation. The material comprised fifty seedlings of each of twenty-one crosses, this number being considered sufficient to represent each cross. These seedlings were additional to those required for planting the first-year seedling nursery of the B.45′ series. The populations of fifty each were divided into two plots, each comprising twenty-five seedlings, so that in all the layout comprised duplicate plots of twenty-five seedlings each for each of twenty-one crosses. A plot of twenty-five plants of the susceptible variety Ba.11569 was added to each of the two replicates. The source of the virus consisted of diseased stools of B.2935, B.3013 and B.34104 collected from various parts of the Island.

METHOD OF INOCULATION

As preliminary work done at this Station by Stevenson had shown that the Sein Method was the most successful under local conditions, it was decided to experiment with this first. Sein used a six inch piece of diseased leaf one inch wide, wrapped this tightly round the central unrolled leaf spindle of the plant to be inoculated and thrust a bunch of fine insect pins repeatedly through this

into the tender tissues of the unrolled leaves, until 75 to 100 punctures had been made. This method was tried but found to be very cumbersome, and the following modification was adopted. A long strip of diseased leaf was cut, doubled in half, and this was placed round the central unrolled leaf spindle, and held between the thumb and fore finger of the left hand. The leaf was rolled between the thumb and fore finger until it became quite tight, when it was pinched between the thumb and fore finger. Inoculation was then done in the usual way, using a bunch of No. 000 insect pins thrust through a cork, and projecting about $\frac{3}{8}$ of an inch. These pins were not of the best steel, and tended to bend quickly, so that they constantly had to be renewed. As the supply of pins available was very limited, some five sewing needles were bought, and these were reduced to a smaller diameter on an oil stone for a distance of approximately $\frac{3}{4}$ inch from the point. These were found to be quite as fine as the No. 000 pins, and less liable to bend, although one or two occasionally broke.

TESTING THE TECHNIQUE

Five plants of the susceptible variety Ba.11569 were inoculated at each of the following times:—8 a.m., 10 a.m., 12 noon, 2 p.m. and 4 p.m. Thirteen days later, all plants showed the disease, so that it was concluded that time of inoculation had nothing to do with the artificial transmission of the disease. Further, the technique appeared to be quite satisfactory, and to test it further, the remainder of the Ba.11569 plants were inoculated. All but two of these showed symptoms of the disease twelve days later. The two plants not showing the disease were rather weak and unhealthy looking and it was thought at the time that the symptoms might be delayed or masked. Both these plants showed typical mosaic symptoms two days later.

Having obtained a satisfactory technique, the next step was to find out what percentage of the seedlings of each cross showed resistance to the disease. Inoculation of the seedlings was accordingly started, using B.2935 and B.34104 infective material. By the end of September 1943, the following results had been obtained:—

CROSS	No. of Seedlings Inoculated	No. Infected to 18.10.43	Percentage Infection
B.39223 x B.34104 ..	49	4	8
B.38203 x B.34104 ..	50	3	6
B.3392 x B.34104 ..	50	2	4
B.38187 x B.34104 ..	50	Nil	Nil
B.35207 x B.39156 ..	50	Nil	Nil
Co.421 x B.34104 ..	50	Nil	Nil
B.3439 x B.41235 ..	25	Nil	Nil
B.39157 x P.O.J.2878 ..	48	6	12
B.35206 x Co.290 ..	50	2	4
B.3353 x B.40175 ..	50	Nil	Nil
B.35206 x B.37256 ..	50	11	22
B.38272 x B.34104 ..	50	5	10
B.3439 x B.(30)L.7 ..	47	3	6
B.3371 x B.37193 ..	25	Nil	Nil
B.35206 x B.34104 ..	25	Nil	Nil
B.35207 x Paseoroean ..	25	Nil	Nil
B.37161 x B.37256 ..	25	1	4
B.3365 x B.41242 ..	50	5	10
B.4092 x B.37193 ..	50	Nil	Nil
B.3353 x B.37256 ..	50	3	6
B.3274 x B.34104 ..	50	6	12
Ba.11569	50	50	100

It is too early to draw any definite conclusions but this work will be developed.

FUTURE WORK

VIRUS STRAINS IN BARBADOS.

With a view to investigating this aspect of the disease, arrangements have been made to collect mosaic material of ten varieties in each of ten ecological categories in the Island. This is to be done with the assistance of Mosaic Disease Inspectors, whose work of inspection covers the Island. It is proposed to grow plants from diseased material derived from each of the ten varieties from each category, to compare the symptoms, and to see if it is possible to recognise strains by their symptoms as expressed in a collection of the following eight varieties selected as possible indicator plants:

Ba.11569
B.H.10(12)
B.3439
B.34104
B.35187
B.37161
P.O.J.213
P.O.J.234

IX. STATEMENT OF EXPENDITURE FOR 1942—43.

		£	s.	d.
1.	Personal Emoluments	1,330	13	9
2.	Provident Fund	40	0	0
3.	Seedling Trials	496	4	10
4.	Stationery and Library	38	17	1
5.	Travelling	137	17	11
6.	Incidentals	26	12	4
7.	Capital	126	16	4
	Total	2,197	2	3

APPENDIX I.

SUGAR CANE BREEDING, SEEDLING RAISING AND FIELD NURSERY PLANTING 1942-43—B.45′ SERIES

Details of Crosses made, their Germinations, Numbers Potted and Numbers Planted in the Field Nursery

CROSS.	GROUP	No Germinations 1942—43	No. Potted 1943.	No. Planted in Field Nursery.
	S. officinarum			
B.3439 x E.K.28 ..	Noble	45	0	0
	S. officinarum x Sorghum vulgare			
B.3439 x Early Bascom..		50	37	30
B.3013 x „ ..	.. .. ..	1	0	0
B.3439 x Crop ..	.. .. ..	53	53	35
		104	90	65
	S. officinarum x Erianthus arundinaceus			
B.3439 x 28 N.G.7 ..	Noble x E. arundinaceus	0	0	0
	S. officinarum x S. barberi			
B.3439 x P.O.J.234 ..	Chunnee 2nd nobilisation	1528	1381	0
	S. barberi x S. spontaneum			
B.35207 x B.39156 ..	Chunnee x Celebes ..	244	244	200
B.35206 x B.37256 .	„ x Local ..	914	570	408
B.37161 x B.37254 ..	„ x „ ..	245	245	199
B.37161 x B.37256 ..	„ x „ ..	798	504	400
B.3365 x B.35187 ..	„ x Glagah ..	640	640	562
B.3365 x B.39220 ..	„ x „ ..	208	208	149
B.3365 x B.39229 ..	„ x „ ..	4	0	0
B.3365 x B.41276 ..	„ x „ ..	194	194	140
B.3365 x B.41242 ..	„ x „ ..	2551	850	200
B.37161 x B.35187 ..	„ x „ ..	36	36	28
B.37194 x P.O.J.2878 ..	„ x „ ..	62	0	0
B.35207 x Pasoeroean ..	„ x „ ..	444	340	202
B.3353 x B.40175 ..	„ x „ ..	2808	520	392
B.3371 x B.37193 ..	„ x „ ..	3328	609	553
B.3439 x B.41235 ..	„ x „ ..	1447	376	301
		13,923	5,336	3,734
	S. barberi x S. sinense			
	Chunnee x Sinense ..	6	0	0
B.3365 x B.35269 ..	„ x „ ..	0	0	0
B.37161 x B.35275 ..	„ x „ ..	12	0	0
B.35206 x B.35275 ..		18	0	0
	S. barberi x S. robustum			
B.35206 x 32 M.Q.629 ..	Chunnee x S. robustum	293	293	250
B.37161 x 32 M.Q.579 ..	„ x „	1	0	0
B.37161 x 28 N.G.251 ..	„ x „	3	0	0
B.3365 x 32 M.Q.657 ..	„ x „	158	158	141
		455	451	391

APPENDIX I—*Continued.*

SUGAR CANE BREEDING, SEEDLING RAISING AND FIELD NURSERY PLANTING, 1942-43—B.45′ SERIES

Details of Crosses made, their Germinations, Numbers Potted and Numbers Planted in the Field Nursery

CROSS	GROUP	No Germinations 1942—43	No. Potted 1943.	No. Planted in Field Nursery.
	S. barberi x Erianthus arundinaceus			
B.37161 x 28 N.G.7	Chunnee x E. arundinaceus	0	0	0
	S. barberi x Sorghum vulgare			
B.37161 x Imphee ..	Chunnee x Sorghum ..	2	0	0
	S. officinarum x S. sinense			
B.3439 x B.35275 ..	Sinense 2nd nobilisation ..	40	40	0
	S. officinarum x S. spontaneum			
B.3439 x B.39252 ..	Local 2nd nobilisation ..	79	79	60
B.3439 x B.(30)L.7	Glagah 4th nobilisation ..	4326	4030	1098
		4405	4109	1158
	S. spontaneum x S. spontaneum			
B.39157 x P.O.J.2878	Glagah x Celebes	1205	530	301
B.3353 x B.37256 ..	„ x Local	2640	620	601
		3845	1150	902
	S. spontaneum x S. sinense			
B.3439 x B.35276 ..	Glagah x Sinense	19	0	0
„ x B.37261 ..	„ x „	276	236	200
B.3353 x B.35275 ..	„ x „	75	75	70
B.39254 x P.O.J.2878	„ x „	141	141	100
		511	452	370
	S. spontaneum x S. robustum			
B.3353 x 32 M.Q.629	Glagah x S. robustum ..	40	40	37
„ x 28 N.G.251	„ x „	21	21	13
		61	61	50
	S. Spontaneum x sinense x S. spontaneum			
B.39207 x B.35276 ..	Glagah x Sinense x Celebes	13	13	0
	S. spontaneum x S. sinense x S. barberi			
B.3365 x B.37261 ..	Glagah x Sinense x Chunnee	137	137	118
B.37161 x B.40267 ..	.. x „ x „	0	0	0
„ x B.40270 ..	.. x „ x „	3	0	0
„ x B.35276 ..	.. x „ x „	160	160	158
„ x B.37224 ..	.. x „ x „	393	393	301
		693	690	577
	S. Spontaneum x S. Barberi x Spontaneum.			
B.3365 x B.39257 ..	Glagah x Chunnee x Local	57	57	50
B.37161 x B.38279 ..	.. x „ x „	44	39	0
		101	96	50

APPENDIX I—*Continued.*

SUGAR CANE BREEDING, SEEDLING RAISING AND FIELD NURSERY PLANTING, 1942-43—B.45′ SERIES

Details of Crosses made, their Germinations, Numbers Potted and Numbers Planted in the Field Nursery

CROSS	GROUP	No Germinations 1942—43	No. Potted 1943	No. Planted in Field Nursery.
	S. officinarum x S. robustum			
B.3439 x 32 M.Q.579	S. robustum 2nd nobilisation	333	333	285
„ x 32 M.Q.135	„ 2nd „	93	93	68
		426	426	353
	Co.290 and its derivatives			
B.37266 x Co.290 ..	Co.290 x Glagah	34	34	16
B.3353 x „ ..	„ x „	646	646	590
B.3371 x „ ..	„ x „	51	50	50
B.39192 x „ ..	„ x „	11	0	0
B.3439 x Co.419 ..	„ x „	185	185	159
B.35206 x Co.290 ..	„ x Chunnee ..	301	247	200
B.4092 x B.37193 ..	„ x „	1,830	1,121	700
B.37161 x B.40118 ..	„ x „	19	0	0
B.39254 x Co.290 ..	„ x Sinense	270	270	250
		3,347	2,253	1,965
	Co.281 and its derivatives			
Co.281 x B.H.10(12)	Co.281 x Noble	95	95	90
B.39177 x B.34104 ..	Co.281 x Co.190	92	92	84
B.4094 x „ ..	„ x „ x „	1	0	0
B.38203 x „ ..	Co.281 x Glagah x Chunnee	3,579	1,216	1,000
B.38233 x „ ..	„ x „	410	410	391
B.38260 x „ ..	„ x „ x „	416	416	390
B.35206 x „ ..	Co.281 x Chunnee ..	1,186	521	498
B.39200 x „ ..	„ x „	74	74	0
B.39240 x „ ..	„ x „	13	9	0
B.39254 x „ ..	Co.281 x Sinense	69	69	60
B.3353 x „ ..	Co.281 x Glagah	1,159	1,159	1,008
B.3354 x „ ..	„ x „	1,260	1,200	998
B.3371 x „ ..	„ x „	1,089	1,089	825
B.3392 x „ ..	„ x „	1,428	63	494
B.39211 x „ ..	Co.281 x Glagah	190	155	137
B.39223 x „ ..	„ x „	449	449	442
B.38187 x „ ..	„ x „	555	220	200
B.3274 x „ ..	„ x „	1,761	1,110	1,010
B.38272 x „ ..	„ x „	1,151	610	410
B.41277 x „ ..	„ x „	47	0	0
Co.421 x „ ..	„ x „	1,251	600	600
		16,275	10,193	8,637
	GRAND TOTALS ..	45,792	27,041	18,252

APPENDIX II

SUGAR CANE FIRST YEAR SEEDLINGS—B.44′ SERIES

List of Crosses and the Numbers of Seedlings Planted in the Field Nursery (April/May, 1942) and the first year Seedling Trial (October/November, 1942)

CROSS.	GROUP	No. in Field Nursery	No. Planted in First Year Seedling Trial.
	S. officinarum		
B.3439 x Ba.6032 ..	Noble	190	136
B.3439 x B.2935 ..	„	80	74
B.3439 x B.417 ..	„	491	390
		761	600
	S. officinarum x S. spontaneum.		
P.O.J.2878 x B.H.10(12 ..	Noble x Glagah	96	62
B.3439 x B.35187 ..	„ x „	100	80
B.3439 x B.39282 ..	„ x „	90	89
B.3013 x P.O.J.2878 ..	„ x „	30	25
B.34137 x B.417	„ x „	239	104
B.3013 x Kloet ..	„ x „	241	169
B.3013 x B.37256 ..	Noble x Local	51	40
B.3439 x B.37254 ..	„ x „	21	16
B.3439 x Tabongo ..	Noble x Celebes	95	47
		963	632
	S. officinarum x S. barberi		
B.3439 x P.O.J.234 ..	Noble x Chunnee	366	289
	S. barberi x S. spontaneum		
B.35206 x B.35253 ..	Chunnee x Local	21	16
B.35206 x B.37256 ..	„ x „	23	16
B.35207 x P.O.J.2878 ..	Chunnee x Glagah	521	410
B.3354 x B.38270 ..	„ x „	290	223
B.38260 x B.H.10(12) ..	„ x „	12	12
B.34102 x P.O.J.234 ..	„ x „	84	47
B.3353 x B.37175 ..	„ x „	50	40
B.3353 x B.35245 ..	„ x „	51	40
B.37161 x B.3337 ..	„ x „	2,807	1,246
B.3354 x B.35245 ..	„ x „	90	73
B.37161 x B.35187 ..	„ x „	22	20
B.37161 P.O.J.2878 ..	„ x „	208	152
B.37266 x B.35245 ..	„ x „	48	31
B.3354 x B.37175 ..	„ x „	666	502
		4,893	2,828

APPENDIX II—*Continued.*

SUGAR CANE FIRST YEAR SEEDLINGS—B.44' SERIES

List of Crosses and the Numbers of Seedlings Planted in the Field Nursery (April/May, 1942) and the first year Seedling Trial (October/November, 1942)

CROSS.	GROUP	No. in Field Nursery	No. Planted in First Year Seedling Trial.
	S. barberi x S. sinense		
B.3365 x B.40271 ..	Chunnee x Sinense	126	68
	S. barberi x S. sinense x S. spontaneum		
B.3365 x B.35276 ..	Chunnee x Sinense x Glagah ..	19	17
B.3365 x B.40266 ..	Chunnee x Sinense x Glagah ..	120	85
		139	102
	S. barberi x S. barberi		
B.35206 x P.O.J.234 ..	Chunnee x Chunnee	17	15
	S. officinarum x S. robustum.		
B.3439 x 28 N.G.251 ..	(i) 1st nobilisation	3,387	1051
B.3439 x 32 M?Q.579 ..	(ii) 2nd nobilisation	179	139
		3,566	1 190
	S. sinense x S. spontaneum		
B.3353 x B.35275 ..	Sinense x Glagah	147	112
B.3354 x B.35275 ..	„ x „	30	20
B.3353 x B.35276 ..	„ x „	79	67
		256	199
	Co.290 and its derivatives		
B.3439 x Co.290	Co 290 x Noble	640	578
B.37266 x Co.290 ..	„ x Glagah	80	70
B.35206 x Co.290 ..	„ x Chunnee	20	14
B.40272 x Co.290 ..	Sinense x Glagah	1,134	802
		1874	1,464
	Co.281 and its derivatives		
Co.281 x B.H.10(12) ..	Co.281 x Noble	44	36
B.3274 x B.34104 ..	„ x Glagah	60	49
B.38187 x B.H.10(12) ..	„ x „	24	20
B.35261 x B.34104 ..	„ x „	616	477
P.O.J.2725 x B.34104 ..	„ x „	600	423
B.3172 x B.34104 ..	„ x „	414	298
B.3354 x B.34104 ..	„ x „	375	345
B.34102 x Co.281 ..	„ x „	40	24
B.3371 x B.34104 ..	„ x „	30	20
B.3353 x B.34104 ..	„ x „	580	432
B.3439 x B.38192 ..	„ x „	100	82
B.35207 x B.34104 ..	„ x Chunnee	186	147
B.3365 x Co.281 ..	„ x „	44	18
B.35206 x B.34104 ..	„ x „	50	40
B.35271 x B.34104 ..	„ x Sinense	50	40
		3,215	2,451
	GRAND TOTALS	16,176	9,838